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ABSTRACT

Cooperative learning lessons in mathematics were instituted in 6 learning disability elementary classrooms serving a total of 47 students. Verbal rehearsal and collaboration were intended to reinforce the internalization and generalization of skills. Structured social interaction was intended to facilitate peer acceptance. Although two of the classes were not able to consistently follow through with the cooperative learning curriculum, the four classes in which teacher participation was kept at an optimal level through consistent monitoring and feedback demonstrated accelerated math progress for the 6-month period. Students in these classes also decreased negative behaviors, practiced collaboration, and increased time on task. The practicum report contains a description of the community and population, a problem description and review of related literature, a statement of anticipated outcomes on the evaluation instruments, and a description of the solution strategy. The final section gives results, conclusions, and recommendations, and dissemination activities are described for the report and lesson plans. Appendixes provide further information on target behaviors, discussion questions, demonstration lessons, block plans, sample daily plans, and a social skills lesson plan. (DB)

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Implementing Cooperative Learning within Six Elementary School Learning Disability Classrooms to Improve Math Achievement and Social Skills

by

Lorraine F. Goldberg

Cluster XXIV

A Practicum II Report Presented to the Ed.D Program
in Early and Middle Childhood
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA UNIVERSITY

1989

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ABSTRACT

Implementing Cooperative Learning within Six Elementary Learning Disability Classrooms to Improve Math Achievement and Social Skills. Goldberg, Lorraine F., 1989: Practicum Report, Nova University Ed.D. Program in Early and Middle Childhood. Descriptors: Cooperative Learning/ Elementary School Mathematics/ Exceptional Child Education/ Inservice/ Inservice Education/ Instructional Materials/ Learning Disabilities/ Mainstreaming/ Mathematics Achievement/ Mathematics Instruction/ Peer Teaching/ Special Education/ Social Adjustment

Students with severe academic deficits who have mild handicaps are placed in special education categorical classrooms wherein an individualized program is expected to meet their needs and remediate their skill deficiencies. Additionally, it is assumed that the more appropriate, less demanding setting will decrease students' negative self-concept exacerbated by academic failure. Current research and conventional wisdom indicate that classified handicapped students do not make progress commensurate with the increased costs of these special programs, and remain socially isolated from their peers.

Cooperative learning lessons were instituted in six learning disability classrooms to assist in teaching the math curriculum. It was assumed that verbal rehearsal and collaboration would reinforce the internalization and generalization of skills. Furthermore, structured social interaction was intended to facilitate peer acceptance.

Results were generally positive when teacher participation was kept at an optimal level through consistent monitoring and feedback. While in two classes this was not possible, four classes demonstrated accelerated math progress for the time in school. These same students decreased negative behaviors, practiced collaboration, and increased time on-task.

Chapter I

INTRODUCTION

Description of Community

This project took place in three elementary schools located in one geographic and administrative area of a public school system that serves approximately 190,000 children, and provides ancillary services to 20,000 additional parochial school students. Although according to the last published census, black people in the city outnumber whites by better than two to one (1980 Census of Population), 90% of the children in the schools are black. Much of the population, factory workers and their descendants who emigrated here during World War II, are now victims of the deterioration and decentralization of the auto industry. No longer are seen swarms of workers rushing to and from the large plants on both east and west sides of the city, and public transportation is virtually nonexistent. Today, most traffic consists of middle-class suburbanites driving into the commercial center of the city, and leaving at day's end.

For every new business moving into the city, two more move out, and now more than a third of the city's 1.2 million people are on welfare. The rise of this "black urban underclass" (Wilson, 1987), the direct result of the loss of millions of low- and semiskilled jobs, has destabilized the black family. In 1940, less than 18% of black families were headed by women, whereas today the figure approaches 43%, the majority of whom were never married. Simultaneous with the decrease in jobs has been the flight of the middle and working classes out of the city, leaving the underclass socially isolated.

Current renovation occurring in the commercial center of the city has had little impact on the lives of the residents. Despite the increase in out-of-town visitors, the city seldom looks busy, even during the day when most of the visible shoppers are black people who have a lower income level than their white counterparts who flock to the suburban malls. The decrease in housing and population has resulted in more than a normal percentage of the aged, very young, and poor - both black and white (Widlick, 1972). The current deficit in the school budget is, to a large extent, a function of the major dependence on decreasing revenues from a shrinking local property tax base.

Additional monies are provided by the federal government to schools with economically disadvantaged children, and ear-marked state dollars are available for remediation of gross achievement deficits. An effort to create state-wide equity a few years ago through funding from other sources resulted in even greater disparity since communities with large resources continued to provide more than the state allotment. Proposed legislation shifting the burden onto a sales tax to be divided equally throughout the state faces an uncertain future at this point. In fact, the very latest constitutional amendment was just defeated in the state Senate after having passed resoundingly in the House. In a state where the expenditure per pupil varies from $5915.59 to $1785.38, this urban district ranks among the bottom by providing $2798.50 per pupil (Citizens Property Tax Report, 1986). Furthermore, the district's deficit, $103.5 million (House Republican Press, 1989), is so great that the superintendent has resigned and the state may need to assume control.

Writer's Role

As a school psychologist assigned to service four elementary and two middle schools in one geographic region of a large urban school system, only one responsibility, that of special education evaluator, is contractually defined. As a consequence, identifying potential handicapped school-age children and conducting federal and state mandated reevaluations of students in special education programs is the primary role of this writer. Practically speaking, the expectation is that the psychologist identify, evaluate, and actually place children in special classes by coordinating and chairing the IEPC. In this way, the psychologist is nominally held accountable for the selection of the special students, and their subsequent adjustment to the program. Unstated, but arbitrarily imposed, are other professional duties which oftentimes preempt the limitless accumulation of requested evaluations. Both through training and according to the National School Psychology Inservice Training Network, held in 1984, school psychologists have the knowledge base to offer amongst other services: "approaches to class management....; consultation on major theories, and the instructional application to learning....; research on teaching basic skills....; and advise on the development of adapted instructional programs for handicapped students" (pp. 10-11). Thus, providing assistance to all teachers when existing solutions are ineffective periodically assumes situational dominance. Teacher requests for motivational or instructional strategies, available support personnel, or interpretation of students' behaviors must be accommodated. In this way, the school psychologist is charged indirectly with classroom interventions and innovations that are not directly provided by any other system service.

Description of Population

Four of the six learning disabilities classrooms that participated in this project are located in school buildings serviced by this psychologist. The other two are in one building, physically proximate, and serviced by a colleague. Since the number, age level, and category of special education classes in each school varies according to available space or other unknown administrative reasons, there were only five possible classes that fit the target population. Of these, one teacher almost immediately demonstrated her reluctance to participate. Since the teacher of an additional class that was added in the initial school serviced by the other psychologist expressed enthusiasm for the project, this teacher's class was substituted for the similar disinterested teacher's group. Thus, three classes were in one school, two in another, and the sixth in still another elementary school. The students in these rooms have been individually evaluated and placed by an Individualized Education Placement Committee (IEPC) into this categorical self-contained program, in accordance with the requirements of PL 94-142, state rules, LEA policy, and local school board procedures. Legal requirements limit enrollment to 15 students with one certified and categorically endorsed teacher, but no more than 10 children may be present at any time without an adult aide. In policy, only 11 students have been in each room. The ability level of these children range from borderline impaired to average, and while the specific processing deficit may vary, most have attentional problems and verbal discrepancies. In general, students spend the majority of the day in this setting, segregated from most regular children, but integrated into the lunch program, school-wide fund raising, and extra-curricular activities. In addition, some handicapped youngsters receive social work services and/or speech therapy in accordance with their special needs. Generally, differences in behavior are more a function of age than any other variable and all of the teachers are relatively experienced. Most of the children have been placed in these rooms because their functional grade levels in all academic skills are more than three years below age expectancy. Virtually all of the students are boys.

Actual school placement is performed by a district administrator who, to the extent possible, follows the neighborhood school concept. Thus, it may happen that some of the special children walk to school, while others are provided with door-to-door transportation at the system's expense. While a large number of the students in these six classes have been evaluated or reevaluated by this psychologist, many of this highly transient population come from other schools in this regional district. Some children come from other areas of the city, and a few from the local private and parochial schools. A scattering of transfer students from other state systems, and out-of-state public schools are also enrolled since this city's policy is to automatically honor placement of all children who have official IEPC papers from anywhere in the country.

While all three schools are in the same administrative area of the school system, the socio-economic status (SES) of the surrounding neighborhoods and respective school population is quite diverse. The school which houses the three learning disability classes is in a highly desirable residential area, most of the people who live here are solidly middle class, and own their homes. Homeowners even employ a private security service. While the population is racially mixed, all of the white and many of the black residents send their children to private schools or to the magnate open school. As a result, the school children are 100% black and a large proportion come from other attendance areas by special permission, causing excessive crowding. Despite these arbitrary conditions, the overall and handicapped student body appear to be functioning cognitively at a level above the pupils in the other schools serviced by this writer.

Since state special education rules require class grouping by age, the four classes in this building are divided into two levels: two lower elementary classes, ages six through nine; and two upper classes, ages nine through twelve. The teachers of the younger groups are team teaching this year and are housed in one large room. Supplies are relatively abundant here since additional money is occasionally given by the affluent parent group.

The second elementary school serviced by this psychologist is vastly underpopulated, and while there are four special classrooms contained here, only one has a learning disability classification. This upper level class, and the regular class children alike, have a 60/40 white-black racial mix. The neighborhood residents are predominantly white, and extremely transient. Eighty percent are below the poverty line, and while the parents are very visible, few actively participate in school activities and conferences. The school boundary encompasses several foster-care homes, but the majority of the households reflect the city as a whole; most are single parents with multiple children who are supported by public assistance.

The third school is in one of the most economically depressed areas of the city, and as a consequence qualifies for, and receives compensatory assistance from federal and state funds for academic and social remediation. Unique in its small size, hardly 200 students, this school has both a reading specialist and counselor. The learning disability class is comprised of students in the nine through twelve-year-old range, and are all black, whereas the rest of the school children are only 50% black.

Local administrators are nominally responsible for all classrooms within their buildings, yet since none of the principals in these three schools have had special education background, they allow the special teachers much more autonomy than the other staff members enjoy. Teacher and student accountability is based on the standardized test scores administered to all students - except the special education children, whose progress is monitored by no one. The special education department does require that one objective test be given each year, yet the choice appears to be the individual teacher's, and often a criteria-referenced instrument is used. Similarly, it is suggested that these teachers use the same curriculum materials that have been adopted city-wide, yet since this program is generally inappropriate for this population, a variety of other strategies are encouraged.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

Theoretically, children who experience learning problems require some type of specialized intervention, and historically if the discrepancy from the norm was too great, these youngsters were either ignored or isolated. As the result of the universal literacy philosophy and, more recently, the civil rights movement, it was considered the right of all children to be offered equal educational opportunities, and in the least restrictive environment. It was intended that through the passage of PL 94-142, the high incidence categories, the mildly handicapped, would be instructed in settings approximating the normal classroom, with the return to the mainstream as the eventual objective.

Many schools, including this target group, have used special education as a refuge from dealing with overpowering classroom demands. Teachers and administrators are held responsible for the progress of their students, and despite the diversity of their population, are expected to demonstrate uniformly increased test scores. Often children display anti-social behaviors which interrupt instruction. Space and materials are at a premium, and class enrollment exceeds 35, a number beyond the patience and tolerance of many teachers. No aides are available, there is no support personnel to assist, children are truant, malnourished, abused, and neglected. Then too, teachers are not experienced in the strategies appropriate to the various exceptionalities: perceptual disabilities, impaired cognition, attentional deficits, etc.

As a result, children, when classified as special are 'hidden' in separate rooms, never to emerge. The law which permits this, mandates specific monitoring rules which are strictly enforced. A reevaluation must occur at least once every three years to assess the continued need for these very expensive services. Annual goals must be documented and signed by designated school personnel, and the parents, whenever possible. In point of fact, few parents in these schools demonstrate any interest in, or knowledge of the progress their children are making. The system, itself, has no procedures to evaluate student performance, and thus, continues to encourage the continuation of a program that has limited usefulness. One reason, perhaps, for this growth is the availability of funding for special education, within a school system that has accumulated a massive debt and current media scrutiny.

The fact that these special children never master the skills expected of their peers, nor test as well, is a reflection of several conditions. The curriculum that they use may or may not be appropriate to their disability, but congruence with the regular grade is lacking and goal expectations low. There seems to be no coordinated departmental objective to increase special education learning comparable to the extensive instructional improvement effort in regular education. These children learn that they are different, and as time passes this difference becomes a reality. The special teachers become possessive of their children, they develop empathy, and feel, and are made to feel responsible for the youngsters' inability to adjust in regular education classes. In fact, once classified, these children are never treated the same as their nonhandicapped counterparts.

Interestingly, special educator policy makers within this school system are giving lip-service, and mixed signals to the staff by echoing the current national concern over the preponderance and wasted resources of this program. While the efficacy of special education is called into account, no local systematic justification has been done, and the authorities appear reluctant to document the program's effectiveness. One possible explanation of this inaction is the potential cost and personnel necessary for restructuring the two programs.

Integration into the regular class schedule is extremely limited since the teacher directly involved must be willing and cooperative. These are the same individuals who were more than happy to lose these students, and they see no point in allowing them back into their classes. Why then were they removed--and with great effort and time? Even when mildly handicapped children are mainstreamed into academic classes, the regular teachers do not accept responsibility for them. If a problem arises the children are simply sent back to the special teacher. As these children continue to be taught in a manner different from their peers, and are physically and socially isolated, it is no wonder that they seldom, if ever, are returned to regular education, despite the limited severity of their learning or behavior disability.

In short, handicapped students who are placed in self-contained special education classrooms seldom develop the social or academic skills necessary to reenter the mainstream of education.

Problem Documentation

Since there is no organized special education program evaluation, data had to be compiled in individual classes. In one upper elementary learning disability class, the students' records contained no two standardized instruments that had the same statistical properties, so all students were administered the WRAT-R to use for comparison. Most of these children had been administered this instrument within the past year, either during the initial evaluation or during the three year reevaluaton. However, since some youngsters had no previous records, and some had only the Stanford Diagnostic Test, which as a criteria-referenced test provides approximate grade scores only, grade levels, not standard scores were compared. Among the 12 children in this class seven made no academic progress at all in math, and five made grade increases commensurate with the time spent. Of these five, four had obtained previous levels at a beginning first grade, which denoted a complete absence of any skills. Using a time frame, within the past six months one student progressed from a beginning to the end of the second grade math level, and two remained exactly at the same level. During the past one year, one child progressed from the end of the second grade to the beginning third grade, another made no progress, and two advanced more than one and one-half years. Two made two years progress. Within a two year span, one student progressed one year. Over the past three years, the other two students remained at the third grade level. Of further interest is the fact that regardless of their ages, only one student obtained a grade level above the third, and that was a twelve-year-old boy who achieved a beginning fourth grade math level.

Within the schools serviced by this psychologist, there are eight classrooms for the learning disabled: two lower elementary, three upper elementary, and three in the middle schools. The length of time spent in special education ranges from less than one year up to six years, depending on date of evaluation and age of the child. Nonetheless, within this group of students during the past year, only one student out of a possible 96 obtained the skills necessary to reenter regular education.

A perusal of the IEP's in each child's records indicated that very few instructional objectives had been met. Instead, most objectives were repeated for the next year. Even when the expected criteria had been attained, the expectations in all instances were far below equivalent time. Furthermore, the tasks were not comparable to the instruction in regular grades.

Socialization was observed during three types of situations: the structured categorical classroom, formal regular education sessions with mainstreamed students, and unstructured integrated time during lunch. While some of the learning disabled children interacted with their classmates, there was never any mingling between the special and regular children. Indeed, the teachers confirmed the observation that the segregated students were always isolated from the rest of the students in the school. They sit together in the auditorium, in the lunchroom, and alone when mainstreamed into regular classrooms.

Analysis of Problem

Children who have been placed in categorical special education classrooms generally have skill levels far below all other students. Therefore, if the goal of special education is to place children back into the mainstream it is not sufficient just to keep progress commensurate with the time spent in school, academic and social progress must be accelerated. Small, structured instruction should provide the remediation necessary to accomplish this end. Yet, in these target rooms problems are exacerbated not alleviated. Several possible reasons come to mind: the teachers lack adequate training, expectations are too low, incentives or student motivation is lacking, the deficits are too severe, or students cannot develop the compensatory skills necessary to overcome their dysfunctions.

Certainly, it does appear that teaching these special students is a formidable task. Within the class of 12 children, there are possibly 12 different disabilities because despite the mandate to classify according to specified standards, recent research (Gartner & Lipsky, 1987) has demonstrated that these high frequency categories are generally indistinguishable, and in fact, more than 80% of the student population could be classified as learning disabled by one or more definitions presently in use (Ysseldyke, cited in Gartner & Lipsky). Each student is provided with an individualized instructional plan, yet more often than not, there is little congruence between the difference in placement and differences in instruction according to Hagerty & Abramson (1987). These writers have documented the fact that programs for the mildly handicapped do not differ substantially from compensatory education programs. Most time is spent on teacher lectures, whole class explanations, or individual paper and pencil tasks, while individual student-teacher interaction occupies no more of the day than in classrooms of 33 students. In fact, Morsink et al. (1986) stated that the general practice in special education runs counter to effective instructional procedures since little time is spent in activities that involve learner response and teacher feedback. Another study (Shepard & Smith, 1981, cited in Hagerty & Abramson, 1987) found that learning disabled children in Colorado spend 30-35% of their time on repetition and drill of basic skills, and only 15% of time in one-to-one tutoring with regular classroom work.

Often less time is permitted for student-student interaction than is available in the regular classroom. The actuality is that the setting itself is considered the treatment. Furthermore, children are labeled and isolated from the rest of the school, thereby promoting the development of personality problems. Once a youngster is placed on the special education track, from a social learning perspective, lower self-concept is fostered and children view themselves in an unfavorable light (Bandura, 1977). The special classroom differs from the norm by the scarcity of appropriate role models, and the inclusion of few, if any, same-age peers. And the classes are almost exclusively, and unrealistically, boys.

Low expectations are acceptable, and so the pace and amount of work tends to be less than regular education goals. This "safe" place may not be the best learning environment, when little is demanded children "learn to be less than they are" (Granger & Granger, pp. 26-27, cited in Gartner & Lipsky, 1987). The medical model of disability as inherent in the individual is commonly accepted by the average educator in this school system, and as such, two types of individuals are conceptualized, handicapped and nonhandicapped. Such a condition defies permanent remediation. Indeed, many parents as well, take issue with the idea that external factors can affect the condition. In this manner, the stage is set for the self-fulfilling prophecy, and personal accountability is side-stepped. No one questions the lack of progress. This situation makes the transition back to the mainstream almost an impossibility.

Perhaps the single most basic reason that the children in special education do not realize their potential is the absence of the motivation to learn. Johnson and Johnson (1985) defined the motivation to learn as the "degree to which students commit effort to achieve academic goals"(p. 250). And according to these writers, academic goals can be presented through a curriculum, but motivation must be induced through interpersonal processes, and the most influential interpersonal relationship is between peers. Since learning requires goal interdependence, it is fallacious to believe that students can be motivated through rational cognitive processes that are embedded in one's personality. Furthermore, past perceptions of failure reduce motivation when interpreted as solely the individual responsibility of students who may have nothing in their repetoire to alter the course of failure. In this way, it can be seen that the segregated, individualistic self-contained classroom is counterproductive to learning because when rewards are based on self-improvement, the student can only make comparisons with a history of failure.

Related Literature

Although the passage of the Education for All Handicapped Children Act of 1975 (PL 94-142), officially marked the beginning of Special Education or what has been now labeled the "second system" (Hagerty & Abramson, 1987; Wang, 1988), the practice of segregating children with mild handicaps was a by-product of the century-long debate over homogeneous or heteogenous grouping (Leinhardt & Pallay, 1982). The rationale for separating youngsters was protection from the irrevocable psychological harm incurred through repeated failure and peer stigmatizing, and to offer slower and more direct instruction. On the other hand, powerful arguments against separate tracking focus on the futility of lowered expectations, of the pain involved in the actual selection process, and the resultant reality of de facto racial and economic resegregation.

Historically, the shift in emphasis from segregation to integration has been a function of economic and political factors rather than empirical evidence (Leinhardt & Pallay, 1982). The civil rights movement during the sixties questioned the wisdom of placing mildly handicapped children, many of whom were minority students, in 'separate but equal' classes. These special classes were seen as inferior since the curriculum was watered down, the teachers were perceived as inferior, and the label made reentry into the mainstream often impossible (Madden & Slavin, 1983). Public Law 94-142 with its mandate for the "least restrictive environment", a response to the demand for integrated education, advocated a continuum of services that ranged from regular class placement with support from a master teacher to full-time programming in a self-contained facility. Yet, in point of fact, (Gartner & Lipsky, 1987) the proportion of students (25%), in 1975, placed in segregated classrooms has remained constant in the succeeding decade. Today, with school enrollment declining, and the cost of education escalating, the overall special education population rose 16 percent since the law's inception, and the number of students classified as learning disabled rose 119 percent. In addition, funding for PL 94-194 has increased substantially from $100 million in 1976, to $1.64 billion in 1985. These concerns, along with unreliable assessment procedures, have led several researchers (Wang, Reynolds, & Walberg, 1988) to form an initiative to fuse the "second system" with the mainstream of education. Yet practical considerations aside, the question remains - has the practice of segregating children with special needs been effective?

The Effectiveness of Special Education

According to Madeleine Will, Assistant Secretary for the Office of Special Education, "this so-called pull-out approach...has failed in many instances to meet the educational needs of these students and has created, however unwittingly, barriers to their successful education" (p. 412, 1986). Indeed, these sentiments have been voiced repeatedly by many researchers

(Bloomer, et al., 1982; Carlberg & Kavale, 1980; Gartner & Lipsky, 1987; Leinhardt & Pallay, 1982; Lilly, 1987; Madden & Slavin, 1983; Reynolds, Wang, & Walberg, 1987), yet the evidence is far from conclusive since the studies have been confounded by methodological problems, incomplete data for meta-analysis, and controversy regarding adequate evaluation measures (Carlberg & Kavale, 1980).

The Carlberg and Kavale (1980) meta-analysis, perhaps the most widely quoted article, selected fifty primary research studies and using the statistic of Effect Size (ES) combined the results. Only studies that investigated categories of exceptionality, special placement, and comparison groups could be used. In addition, the results had to be in a form appropriate to the meta-analysis. Of the 860 studies identified, only 50 could be located that met the inclusion criteria. Results of the analysis showed that special class students as a consequence of their placement, declined 6, 4, and 1 percentile ranks on achievement, social/personality, and other measures, respectively. Similarly, variables such as IQ, age, sex, duration of treatment, sample size, date of publication had little effect on the relative superiority of regular class placement over segregated classes. When ES was aggregated by category of exceptionality, differential special class effects emerged. In general, the children who had average intelligence benefited from special placement; children labeled as learning disabled or emotionally disturbed made greater improvements in the special settings across all three measures. While not questioning the final conclusions, Tindal (1985) criticized the accuracy of the Carlberg and Kavale analysis by listing improper primary study figures, and he found fault with the self-imposed entire program limitation.

Citing past research reviews, Leinhardt and Pallay (1982) argued that while most studies have demonstrated the ineffectiveness of segregated class settings, this was the effect of negative selection which weakens achievement. These writers state that the reason pull-out programs more recently are reporting positive results is a function of teacher effectiveness, not isolated environments. Furthermore, an in-depth content analysis was thought preferable to Carlberg and Kavale's meta-analysis which is a summation with little insight. Early studies of Educable Mentally Retarded (EMR) children showed that those who received no special help in the regular classroom did equal or better to their counterparts in academics, yet neither environment was effective in absolute terms. In most cases the special classes used watered-down curriculum, made no effort to alter instructional methods, and stressed life skills over academics. Methodological shortcomings included selection bias. Later studies, during the 1970s, were more carefully designed and of the seven reviewed here, all students in four studies did better than their regular class controls, two of the others involved higher achieving students while the seventh did not use matched controls. With regard to the social and emotional impact on children in special settings, Leinhardt and Pallay confined themselves to self-perception and peer acceptance. They found that the massive amount of literature generally agreed that special children are less popular than normal children, but that most, especially EMR's, have closer peer relations in isolated classes than in integrated ones.

In an extensive review of the literature, Madden and Slavin (1983) grouped all mildly handicapped classifications together. After discussing the major methodological flaws, centering around bias in matching samples, two well designed recent studies (Calhoun & Elliott, 1977; Leinhardt, 1980) found that special children in regular classrooms achieved more than their segregated peers. When curriculum methods were controlled, Goldstein, Moss, and Jordan (1965) found also, that the students in regular class fared better than their comparison group. Based on the data reviewed, Madden and Slavin concluded that when curriculum and teacher variables are controlled, there is some factor related to heteogenous placement that enhances learning providing the regular class is structured, even minimally, to meet the needs of the mildly handicapped child. With respect to the social development of these children, the research is equivocal when additional support is not provided in the regular classroom, but overall benefit was found when children were mainstreamed with special support, such as individualized instruction.

Since existing data from PL 94-142 funded programs focuses on compliance related legal requirements which are more procedural than substantive (Wang, 1985), information is inadequate for comprehensive evaluations and generally not available (Hagerty & Abramson, 1987).

One such system-wide evaluation was conducted for the Albuquerque Public Schools special education classes. Using the Wide Range Achievement Test (WRAT) as both the pre and post measure, students in every category of exceptionality made more than average academic gains. However, since the report does not specify, it is unclear whether these students received pull-out services, or what constitutes 'average' gains. Without documentation of regular students' progress, it is possible that these gains were less than system-wide expectations.

Since California has legislation mandating annual comprehensive evaluation, including pupil performance, data analysis is available from this state. In the 1980-81 annual report to the state board of education, the California Master Plan for Special Education gathered data that found learning handicapped students in special classes made about half as much gain in reading, spelling, and math tests as do typical regular students. The San Juan Unified School District, in Carmichael, California (Enell, 1980), collected standardized test scores for the 4700 students served by PL 94-142, in the 1978-79 school year, and compared academic growth with the general education population. Within the targeted student group, over 50% received services for a learning handicap. At all elementary grade levels, average academic gain of the special class students was consistently one to two-tenths of a month less than the students in the resource specialist program which was nine-tenths of a month in reading, and seven-tenths in mathematics for each month of school. As might be expected, the gap increased with each succeeding grade.

The argument might be made that the evaluation instruments used in the preceding studies were not appropriate, that normative tests only reflect placement on a normal distribution (Tindal, 1987). On the other hand, curricula based measurement can assess improvement in achievement. Yet, Anderson-Inman (1987) found that when five mentally handicapped students had demonstrated skill mastery according to criterion-referenced tests, the students' performance did not carry over to the regular class setting. Similarly, Johnston, Allington, and Afflerbach (1985) found that when using divergent curricula, the reading strategies mastered in a remedial reading program were not applicable to the regular classroom.

Criterion referenced testing is subjective, lacks normative reference, and because the data provided is ordinal not interval, many statistical analyses cannot be applied (Glass, 1981, cited in Tindal). Even when improvement can be demonstrated through criteria instruments, it is difficult to determine whether such improvements provide students with the skills necessary to reenter a less restrictive environment. If the goals of special education are to prepare learning disabled students to reenter the mainstream, then the program must be restructured. Tindal (1985) stated that the effectiveness of special education cannot be determined because of the problems associated with research design and inappropriate outcome measures. According to Tindal, "the only conclusion that can be made at this time is that no conclusion is yet available about special education efficacy" (p.109).

Alternative Instructional Approaches

Many researchers (Lilly, 1987; Morsink, et al., 1986; Sapon-Shevin, 1987) have posited the idea that innovative instructional methods are the crucial variable within any classroom, special or regular education, and reform must, therefore, concentrate on effective integration of both programs. Others (Affleck, et al., 1988) have demonstrated that integrated classrooms are superior to any type of pull-out program which are rooted in the "fallacy that poor school adjustment and performance are attributable solely to characteristics of the child rather than to the quality of the school learning environment" (Wang, 1985, p.4). Motivation to achieve goals, given recent credibility as a major determinant in increasing student learning (Johnson & Johnson, 1985), has been conceptualized as an interpersonal process, wherein peer relationships are the most influential relationship available in the classroom. Much of the massive current literature dealing with interpersonal relationships as motivational factors (see, for example, Ames, 1984; Anderson, 1985; Bohlmeyer & Burke, 1987; Johnson & Johnson, 1983, 1985; Johnson et al., 1981; Mevarech, 1985; Parker, 1985; Slavin, 1978, 1980; 1981, 1982, 1987; Yager, et al., 1986) promotes cooperative learning over either competition or individualistic instruction. Indeed, many studies have documented the academic and social benefit of using cooperative learning with handicapped children who are mainstreamed. Johnson and Johnson (1983) compared a group of 59 fourth grade students, 12 of whom were severely learning disabled, by randomly placing them in one of three conditions. The independent variables were individualistic, competitive, and cooperative learning situations, while measurements consisted of interaction during instruction, proximity during free time, perspective-taking ability, and five attitude scales. The results of an analysis of variance showed that the handicapped students received more verbal comments, and were closer during free time to their classmates during the cooperative situation. The nonhandicapped students were better able to take the social perspective of their handicapped peers in the cooperative condition than they were in the competitive condition. And lastly, the cooperative handicapped children had higher self-esteem than the comparable group in either of the other two conditions. The practical implications of this study indicate that when cooperative learning groups are used to integrate special students into the mainstream, the handicapped youngsters will not be isolated but will build social relationships with their nonhandicapped classmates, and all students will increase perspective-taking ability.

Cooper, Johnson, Johnson, and Wilderson (1980) and Johnson and Johnson (1981) found that when mainstreamed students worked together in cooperative groups, social acceptance of all students increased. According to Madden and Slavin (1983), the success of these programs derives from Allport's contact theory of intergroup relations whereby positive interaction depends on four conditions: nonsuperficial contact; cooperative, rather than competitive goals; contact between members encouraged by authorities; and equal status between members. Madden and Slavin (1983) discovered that Student Teams Achievement Divisions (STAD), a specific cooperative learning method, significantly reduced rejection of mainstreamed students, and increased academic achievement of all students. On the other hand, using Team Accelerated Instruction (TAI), a mathematics program encompassing peer interaction and individualized instruction (Slavin, et al., 1984), team effort impact was equivocal. This study, involving 119 academically handicapped elementary grade students, used TAI materials for one group, while another group used the materials without the teams, and the third group used traditional teaching methods. The writers concluded that cooperation may not have been the critical factor because the materials only group also showed significant improvement in sociometric status.

Anderson (1985) demonstrated increased socialization resulting from cooperative learning tasks with a population of 28 learning disabled boys. The treatment consisted of 17 group tasks assigned daily for 30 minutes. The subjects were randomly placed into five groups of five or six students. Peer acceptance was measured by a sociogram, while cooperation measured by a forced choice cards task. Although the limited sample and absence of experimental design precludes great generalizability, this study suggests a useful direction for modifying problematic behavior characteristic of this population.

While research on cooperative learning dates back to the early 1900's, studies of practical classroom application began in the 1970's when several independent groups of researchers almost simultaneously developed cooperative instructional methods (Slavin, 1981). In Slavin's (1981) review of 27 studies that investigated the effects of Student Team Learning, the techniques developed at the Center for Social Organization of Schools, The Johns Hopkins University, a significant positive effect on achievement was seen in 19, no differences in seven, and one favored the control group. In another more recent review, Slavin (cited in Slavin, 1987) located 46 studies that used a cooperative learning method with a comparison group, had at least a two week duration, and assessed individual achievement equally. Twenty-nine, or 63%, found significant gains for the experimental group, while in only two studies did the controls make greater academic progress. However, success was contingent on more than peer interaction; effective cooperative learning includes both group rewards and individual accountability. Slavin attempts to reconcile the Piagetian/Vygotskian developmental approach with the motivational theme of cooperative learning by pointing out that peer explanations create cognitive conflict and ensure resolution.

Slavin (1978) designed a study to separate the effects of the two components in STAD, mutual attraction and student attitudes, on academic performance. Four treatments were used: (a) team reward and individuals compared with class equals, (b) team reward and individuals compared with the entire class, (c) individual reward and comparison with whole class, and (d) individual reward and comparison with equals. Behavioral observation, academic achievement, attitudes, and sociometric measures were the dependent variables. The results demonstrated that participation in the team treatments increased time on-task, but did not affect academic achievement. The team component as opposed to the comparison among equals was found to be the most important component of student team techniques for nonacademic outcomes.

One of the most often cited papers on cooperative learning is the Johnson, et al. (1981) meta-analysis of studies that compare the relative effectiveness of cooperative, competitive, and individualistic goals on achievement. The writers selected 122 studies that were conducted using (a) North American samples, (b) that contained achievement data, and (c) compared two or more of the four goal structures: cooperation, cooperation with intergroup competition, competition, and individualistic effort. Lewin's field theory terminology was chosen over Kelley and Thibaut's theoretical construct. Of the three analyses performed: effect size, voting, and z-score, cooperation consistently promoted higher achievement than interpersonal competition, and favored cooperation over individualistic effort. The results of the cooperation with and without intergroup competition analysis were equivocal, while no significant difference was seen between interpersonal competitive and individualistic goal structures.

The importance of processing to increase functioning in cooperative learning was investigated by Yager, et al.(1986) by randomly assigning students to one of three treatment conditions, cooperation with and without group processing, and individualistic learning. On the daily achievement measure, the processing group achieved significantly higher than the nonprocessing group, while the individualistic learners scored the lowest.

Mavarech (1985) investigated the effects of student teams mastery learning (STML) on mathematics achievement of 134 fifth-grade students in Israel. Of the four treatment models: (a) students teams with mastery learning, (b) teams without mastery learning, (c) mastery learning strategies, and (d) conventional instruction, only the two mastery learning strategies yielded significant gains on both computation and comprehension tasks over the other conditions. The teams treatments were not significant, but the combination of team and mastery produced significant effects on computation not comprehension. This contradiction with previous research was attributed to the homogeneous upper middle-class background of the subjects in this present study who have been found to be less generous and sharing than lower SES children.

More recently, cooperative learning techniques have proved successful in preschool programs (Tudge & Caruso, 1988) where followers of Piagetian theory found that social interaction increases exchange of perspective and decreases egocentricity. At the opposite developmental extreme, Uri Treisman (Jackson, 1989), working with students at the University of California, discovered that emulating the cooperation inherent in the Chinese students' "study gangs" decreased the failure rate of the isolated black students.

Summary

While it has been demonstrated that controversy surrounds assessment of the efficacy of special education programs, most research has been limited to the students' social and academic progress. Absence of national data has encouraged compliance-related reporting rather than comprehensive program evaluations. Nonetheless, it is clear that innovative and effective teaching methods will improve all types of educational settings. Cooperative learning strategies, a promising technique with a growing empirical base, has demonstrated success with the normal population, with mainstreamed special students, and has shown some possibilities with learning disabled children.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

General Goals

The projected goal of this project was to facilitate the development of mathematic skills of students who are in categorical self-contained learning disability programs. These skills were to be congruent with the school system's curriculum, encompassing objectives, testing instruments, and materials. In this way, mainstreaming to regular education will become a viable option.

The children were to exercise collaborative skills which would improve their ability to interact with their peers. Their academic success should improve their self-concept, and increase their frustration tolerance, enabling them to persist at problem solving. Working in groups should lead to goal interdependence and raise motivation for achievement.

The teachers were to learn to use another instructional method which could be applied to many other subjects and situations.

Specific Objectives

At the end of the implementation period at least 75% of the students who participate in more than 60% of the sessions were to raise their math scores by one-half grade on a criterion-referenced test in popular use for regular education students.

The majority of the students would increase the time spent on-task, engage in collaborative behaviors, and decrease conduct that interferes with learning. Specific target behaviors would be enumerated (see Appendix A) and tallied. A pre- and post-intervention observation, recorded by an impartial checker, would be compared.

Each group assignment was to be completed, and the majority of the students were to participate in the cooperative effort.

All six teachers were to use cooperative learning techniques designed for the appropriate math age/grade of their class minimally once a week. Progress, refinements, and feedback would be discussed weekly with the trained consultant. Verbal proficiency and conceptualization of the method would be discussed weekly with the trained consultant. Positive responses from four of the six teachers to a series of questions (see Appendix B) would be considered successful internalization of the material.

A minimum of four teachers would elect to continue the method after the completion of the trial period. Positive findings might also include modifications, and adaptation to other subject areas, or use strictly in the affective domain. Requests from other teachers, and for assistance with problems unrelated to this specific project would be viewed as a successful by-product of this endeavor.

Analysis of Results

For comparison purpose, Key Math, a criterion-referenced test was individually administered to all children in the target classes at the commencement and end of the project. Progress was assessed using grade levels on this standardized instrument which analyzes a variety of math achievement objectives. Although a lengthy instrument which takes approximately 20 minutes to administer, this particular test was selected because it differentiates application from computation. In addition, computation is divided into the four skill areas: addition, subtraction, multiplication, and division, while application is assessed through measurement, mental reasoning, money, time, numeration, symbols, and fractions. Grade scores are furnished for each skill, and the composite as well. These subtest scores not only facilitated individual analysis of specific content, but closely paralleled the curriculum strands advocated by the math and science department of this district (Instructional Sequence, 1985). Although this original Key Math (revision currently in progress) does not provide standard scores or percentiles, and as such has limited statistical use, it was felt that the descriptive and criteria information were more valuable in assessing progress in a practical project of this nature.

An observation chart (Johnson & Johnson, 1984) was prepared for each student participating in this project, divided by group. The desired target collaborative, as well as dysfunctional behaviors were listed, and a frequency count within a five-minute time period was tallied. Since the affective objective was operationalized in terms of the development of specific social skills, an observation sheet recorded by an impartial professional who was not directly involved in teaching seemed appropriate. Data was collected at the beginning of the program, and then again at the completion of the six-month implementation period. Although each assignment could be accomplished within a range of correctness, the goal of each lesson was understanding and effort, ie. the process rather than the product. As a result, specific grades were deemed unimportant, and simple completion was considered the desired outcome. The teachers' record book was checked at the completion of the program to document that all groups had handed in their work sheets for each lesson.

The questionnaires to gauge internalization of the cooperative method were not administered since it was felt that the only purpose of this measure would be to assess skill with cooperative learning jargon. Also, it appeared that the less structured discussion questions (Appendix B) given individually to the participating teachers yielded more information, and contained some redundancy with the formalized instrument.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Solutions

Escalating costs, ethical justification, the absence of any benefit (Gartner & Lipsky, 1987), and the practical implementation of The Education for All Handicapped Children Act (1975) has sparked concern over the continuation of the program under present circumstances (Gartner & Lipsky, 1987; Reynolds, et al., 1988). The charge has been made that segregated classrooms are based on the fallacy that poor adjustment and performance are attributable to student characteristics rather than to the quality of instruction. As a result, participation in special programs often serves to replace curriculum time so that these segregated children are offered less teacher-directed instruction than the instruction in regular classrooms.

Most proposals for change advocate fusing categorical and regular education programs (Reynold et al., 1988; Gartner & Lipsky, 1987), thereby increasing the effectiveness of regular education and reducing the misuse of special education. In one version of the integrated model that has been put into practice in a local district's high school, special education teachers work within the regular classroom, applying specialized strategies whenever needed, servicing all children who are experiencing learning problems. In this manner, students legally classified as handicapped, and regular education students of the full range of ability are together, no one is stigmatized and everyone benefits from the expertise of both teachers.

Gartner and Lipsky (1987) propose a unitary system that stresses effective instruction. One such program, the Adaptive Learning Environments Model (ALEM), introduced into the New York public schools by Wang, Peverly, and Randolph in 1984, involved full-time mainstreaming of special education students with an adapted curricula to each students needs, and paced at an individual rate with students accepting personal responsibility.

Another integrated model that was put into effect in three schools was the University of Vermont Consulting Teacher Program (Leinhardt & Pallay, 1982). The Vermont model was a consulting teacher approach, the special education teachers assisted and trained regular teachers to work with eligible students who were mainstreamed into regular education. These consultants replaced and made unnecessary many of the special education teachers. This indirect approach used matched control schools and found that the children in the experimental treatment made substantially more academic progress than the students in categorical classrooms.

Bickel and Bickel (1986) cite research advocating the positive results of "effective schools", and suggest applying this approach to the special education setting. Since the effective school reform movement is not contingent on setting, administrators should accept greater leadership, develop an orderly climate, demand high achievement, monitor student performance, and emphasize basic skills. Positive expectancy and more time on-task are fundamental to this approach.

While most researchers have used a variety of cooperative learning techniques with special students mainstreamed in regular classes, Anderson (1985) used teams to increase achievement of group of learning disabled children. Cooperative learning refers to a set of instructional methods in which students are required to work together on academic tasks. This method is distinguished from peer tutoring in that all students study the same material, there is no tutor or tutee, and all information comes from the teacher. Basically cooperative learning research has emanated from three sources: the Center for Social Organization of Schools, Johns Hopkins University, the Cooperative Learning Center, University of Minnesota; and Group Investigation, devised by Sharan and Sharan in Israel.

Student team learning at Johns Hopkins includes five methods. In Student Teams-Achievement Divisions (STAD), the teacher first presents a lesson, then students meet in groups of four or five to master a set of worksheets on the lesson, and finally the students are given an individual quiz. The team with the most points, based on the degree to which each student has improved over the student's own past average, wins. In Teams-Games-Tournament (TGT) students compete with others of similar past performance so that success is only contingent on preparation. Team Accelerated Instruction (TAI) combines cooperative learning with individualized instruction to teach elementary mathematics, and Cooperative Integrated Reading and Composition (CIRC) uses teams for studying and has specific lessons for most commercial basal reading programs. Jigsaw, is a situation where each member of the group specializes in one area of the topic, and then meets and exchanges ideas with other experts.

The Group-Investigation model is the most complex of the cooperative learning methods, and since most of the research has taken place abroad, information is rather sparse in this country. Broadly speaking, students work in small groups and take substantial responsibility for what they will learn, how to organize the material, and how they will communicate what they have learned to their classmates.

The cooperative learning method, associated with the Johnson brothers, is less academically structured, and dependent mainly on group interaction. Each group must therefore, be carefully organized by the teacher. The groups consist of three to four students, of diverse ability, who must perceive that they "sink or swim together". The youngsters are to work in such a manner that every member learns, and the subjects must be discussed face to face. The teacher must train the students in this type of collaboration which includes continuous feedback amongst the members and mutual encouragement. The essence of cooperative learning is assigning a group goal, and rewarding each member on the basis of the total product using a criteria-referenced evaluation system.

Within all the massive research involving cooperative learning, the only criticism was the absence of teacher feedback in the actual learning process. It is conceivable then, that misinformation could be disseminated and internalized by the students. On the other hand, this latter method holds much promise for the special education population in self-contained classrooms. Most of the other strategies involve administrative reorganization and are beyond the scope of this writer's sphere of influence. The other cooperative approaches are more academically structured and might not provide the flexibility required to instruct children with such diverse skill levels as are in the categorical classrooms. The approach from Minnesota deals with the major issues that seem to impede progress of these special students, and stresses interpersonal relationships. Renewed motivation is promised, and individual differences taken into account.

Description of Selected Solution

Since 1970, there has been considerable attention given to the effectiveness of cooperative social structures in promoting many different human endeavors. While different cultures depend on competition to varying degrees, the United States has traditionally been a leader in advocating competition in economics, schooling, and recreation (Kohn, 1986). Thomas (1978) found that urban and European children are generally more competitive and less cooperative than rural, non-Western groups such as Australian Aborigines and Canadian Indians. In his book, No Contest: The Case Against Competition (1986), Alfie Kohn explodes the myth that man is innately competitive, citing many theorists and sociologists who agree that even natural selection discourages competition, and this includes many animal species. The notion that people working in consort can accomplish more than people working by themselves is a well established principle of social psychology. The Quality Circles approach (Crocker et al., 1984) is an obvious example of successful cooperation that has been emulated recently by some innovative employers.

The case against competition is strengthened by the growing body of research that shows competition interferes with performance. Practical cooperative learning strategies have now been developed, researched, and found to be effective in increasing not only social goals but basic academic achievement (Slavin, 1987). The reasons for this success are rooted in motivational theory; Johnson and Johnson (1985) state that motivational goals are induced through internalized past relationships and by current interpersonal influences. Humans, not machines or materials, motivate humans to learn.

Cooperative learning refers to a set of instructional methods where students work in small groups, three or four students, of heteogenous ability toward a common goal. While the actual structure is relatively simple, the underlying techniques and ensuing objectives are complex. The teacher presents the lesson, specifies the goals, selects the groups, and organizes the room so that each member can make face to face contact. Each group works on one sheet, and every member must be able to explain all the answers prior to the completion of the assignment since later the students are tested individually but evaluated by groups. Interdependence may be promoted several ways: (a) through materials by using only one copy, (b) through information synthesizing, (c) through intergroup competition, or (d) by assigning roles to the individual members. Individual accountability is encouraged initially by practice tests, having members edit each other's work, or randomly picking one paper from the group to grade. Some of the desired cooperative behaviors may include (a) each member explaining how to get the answer, (b) each member relating what has been previously learned, (c) checking to make sure everyone understands and agrees with the answers, (d) encouraging everyone to participate, (e) each member listening accurately to what other group members are saying, (f) each member retaining a position until logically persuaded otherwise, and (g) students criticizing ideas, not people.

Report of Action Taken

During the school year preceding the projected commencement of this project, all the elementary learning disabilities teachers in the schools serviced by this psychologist were queried as to their interest in participating in a cooperative learning program. Since none had knowledge of cooperative learning, it was suggested that they read the journal article by Johnson and Johnson that appeared in the summer issue of the American Educator (1987) which as members of the American Federation of Teachers they all had received. Before the end of the school year it was explained to them that they would minimally need to use cooperative learning during a weekly math lesson. In order to enlarge the target population, a similar approach and subsequent commitment was made by a colleague to a teacher in a neighboring school. The efficacy of involving another professional is inherent in the method and philosophy of cooperative learning. Indeed, Johnson and Johnson (1987) assert that educators are far less skilled than their industrial counterparts in group problem solving, and that cooperation among adults increases self-esteem, organization commitment, and promotes conceptual understanding of new teaching strategies.

During the following summer both psychologists lived in a university dormitory, and completed the work necessary to earn two credit hours of "A" in a cooperative learning course taught by David Johnson from the Cooperative Learning Center at the University of Minnesota. Course content or cooperative strategies were communicated through role playing. The hundred participants were linked together into base groups of four strangers, randomly assigned. Initial persuasion was dramatically accomplished through the enactment of a cooperative, competitive, and individualistic assignment. The participants found that the competitive situation promoted anxiety, made the individuals overly concerned with other's perceptions, and unreceptive to other's ideas. Individualistic work still encouraged competition, through comparisons with other's work, and had the potential for embarrassment if denied the reward. Cooperation, on the other hand, felt like fun, and the shared responsibility lessened personal anxiety, and fostered curiosity and interest in other people's problem-solving strategies.

The tenets of structured positive interdependence, individual accountability, and collaboration were practiced, as well as jigsawing into other groups. Mock lessons, and social skills were formulated with people working only in groups. The teacher has an ongoing active function; s/he must make systematic observations, assist with tasks, build collaborative skills as the need arises, evaluate the lesson, and encourage group processing, or self-evaluation.

Lectures that interspersed group lessons stressed Dr. Johnson's view that learning takes place out-loud, and not alone, as seen by scientists who only work in teams. Competition, he feels, has a place only when the activity is low-keyed and recreational, while individualism is effective only if the individual is self-motivated a priori. When the pressure to succeed is increased, the support should also be increased. People who feel isolated and disconnected are at-risk for mental illnesses, according to Dr. Johnson. Collegiality builds acceptance of individual differences and increases productivity. To produce and teach a series, or unit, of lessons, some of which were to be cooperative was the ultimate requirement of the course.

When school opened in the fall, each of the children in the six participating classes were given the Key Math test. The grade results were recorded, and set aside along with the protocols for future reference. The new students who were assigned within the first month of the project were also assessed with the Key Math. Each student's IEP was viewed, and it was concluded that all students' skills were similar enough that they could profit from the same general lessons. The lower elementary classes grade levels ranged from .6 to 3.0, while no student in the upper level scored above the third grade. Children were then assigned to permanent base groups in the following manner: each class was divided into three levels of achievement, and one student from the top and one from the bottom were arbitrarily chosen. If the teacher felt that a possible conflict was inevitable, a change of equal achievers was made. Finally, the teacher assigned one or two students from the middle group to each cluster until all children were assigned. Since the two lower elementary teachers were team teaching, only the one teacher responsible for math was involved. Initially this class had only five base groups, but as additional students were placed the groups were altered so that six were formed. Each of the other classes had three groups of three to four students depending on enrollment which fluctuated constantly because students are evaluated and placed continuously throughout the year.

To accommodate and stimulate the teachers, a model lesson was taught by the two psychologists in each classroom. Each teacher was provided with the lesson plan (see Appendix C), and encouraged to circulate and offer assistance only when asked because the students should be encouraged to do their own problem solving. One teacher showed no interest in participating, but instead used the opportunity to leave the room, and it appeared that this class had an inordinately obvious number of misclassified children. Since another class had been formed in one of the other buildings, this new teacher willingly replaced the unmotivated person.

An observation behavior base line was collected in each class by one or another of the two psychologists using Johnson and Johnson's (1984) sample chart. However, the one newly formed class had so few students initially that the groups remained fluid for an extended time period, and thus, an observation was not practical at the commencement of the project.

Simultaneous with the above activities, the district's Elementary Mathematics Instructional Sequence (1985) was analyzed and divided into separate strands and the individual objectives placed in juxtaposition in order of ascending difficulty. Very general, sequential block plans were generated from this chart (Appendix D) in keeping with Johnson's (1984) caveat that teachers should not teach from others' lessons, and too, latitude had to be allowed for the discrepant skill levels of the interested students. In this way, pacing could be flexible and lessons adapted to the particular needs of the individual classroom. Some noncooperative lessons were incorporated into the units to illustrate the useful integration of both strategies. Block plans were organized by unit which correlated with the curriculum strands, and were developed monthly as needed. Although it was hoped that all objectives might be covered within the time span of this project, this was highly dependent on each teacher's style. In point of fact, some teachers preferred to spend more time on one unit, whereas others felt that the variety provided by a circular approach was more productive. Adjustments in the plans were made to accommodate the lower beginning step of the two younger classes, although there was considerable overlap in both cognition and age between the two level categories. The early elementary teacher elected to spend most time on the numeration and number fact units, and had not yet presented the money, calendar, or measurement units at the conclusion of the implementation. On the other hand, another teacher used all the application units, but chose to omit the regrouping unit. The remainder spent some time on all units but at the expense of an in-depth internalization of all information.

The first six lessons (Appendix E) were written out in great detail conforming to cooperative learning procedures (Johnson, 1984). Since cooperative learning was new to these teachers, and requires a great deal of practice according to both Dr. Johnson and the experienced teachers who attended the class last summer, a great deal of direct intervention was necessary during the first month or two. At times, the lessons were modeled by the psychologists with the teachers following the written plans. On other occasions the teachers carried out the plans with the psychologists assisting, gathering feedback, and making suggestions. Discussions were held prior to each of these initial lessons, and the materials, as well as the written plans were provided by the psychologist. For the first month teachers only used cooperative learning under supervision.

Almost from the start it became clear that social skills had to be taught as a separate lesson. The psychologist developed a plan (see Appendix F) according to Johnson's (1984) guidelines, and made a chart for each room enabling each teacher to record points for each group for each skill stressed during the cooperative lesson. Only one skill was listed on the chart initially, and the others were added as the students became more collaboratively adept. Each teacher used the chart and the accumulated points to conform to his/her reward system. One teacher had a room store where the students were able to use their points to purchase items monthly. Another rewarded the youngsters daily with food, still another used a negative system, if they misbehaved they were punished. In one room the children were rewarded for each positive specific behavior with sweets.

In the room where the teacher stressed punishment, one student appeared to be having extreme difficulty communicating with his group members. An individual token system was worked out whereby he would surreptitiously earn points for his whole group each time he displayed the target collaborative behaviors such as offer to go last, suggest some one else have a turn, or praise his peers. The student had his own box to collect the tokens which were kept by the teacher. This potentially useful technique was thwarted when the parents had the child transferred to another school.

In one of the classrooms, the teacher appeared to become overwhelmed by institutional pressures after two months. In order to pursue the project, it was suggested that the psychologist take over the actual cooperative learning lessons which would work as a supplement to her math lessons. This was subsequently done on a weekly basis. A store was initiated and the students earned points by groups that were recorded on the chart which also listed the target behaviors or criteria that was used to assign the points. At the end of each month the students were allowed to purchase items in the box, stocked by the psychologist. The points were cumulative, and the student with the most points could choose first. In this way both individual accountability and reward interdependence were incorporated into the system.

The lower elementary learning disabilities teacher used the block plans for his entire math program, and actually wrote the cooperative lessons into his plan book. Thus, initially he was using cooperative learning on a daily basis. However, his schedule was changed two months into the project and he was able to use the lessons only twice a week for the remainder of the time. This teacher's authoritarian style required some shaping through nonthreatening feedback since he was inhibiting the cooperative peer interaction. Since the other teacher was always available working with the children who were not engaged in math, one child was permanently excluded from the cooperative learning because all indications were that he had been misplaced in this special education category.

Throughout this implementation period materials and ideas were constantly shared from one teacher to another using the psychologist as a conduit. Materials such as clocks were prepared in the curriculum lab, board games were duplicated, counters were borrowed, and computer programs demonstrated on an ongoing and timely basis by the psychologists. For the duration of the program the psychologist visited and observed the cooperative lessons weekly, providing support, feedback, and assistance when needed. All members of each group signed their name to the joint assignment and the teachers collected the papers each cooperative lesson and recorded that the work had been done. As time went on, the psychologist became associated with cooperative learning, and the students' pleasure with the lessons was overtly displayed whenever they saw the psychologist.

Four months after the program was implemented the second psychologist was injured, and was not able to visit the two classrooms on a regular weekly basis. It was hoped that the classroom teachers had become sufficiently proficient to continue on their own with less frequent interviews, and by utilizing feedback from one another.

At the end of the six months, the items in the store went on clearance and the students in the class taught by the first psychologist were allowed to empty the box. They thanked and even hugged the psychologist for the opportunity to participate.

Each class was observed by the this consultant using the same social skills criteria used in the base line observation. The target behaviors (Appendix A) for each student were tallied within a five-minute time span. In the one class that was taught by the consultant, the collaborating psychologist recorded the behaviors. The composition of the specific groups, and even classrooms had altered so that the behaviors were the totals from each class. The same general behaviors were enumerated on an observation check list, and each cooperative group was watched at the end of the treatment program. Since the group numbers and members varied over the specified time period each class was treated as a whole. Every time a child exhibited a target behavior he/she received a point. Each separate group was observed for a five-minute period, watching one student after another in a continuous sequence. The total points for each class were summed and divided by the number of groups to yield a five-minute average. One class could not be compared because there was no opportunity to take a pretreatment observation since the enrollment was built up too gradually.

Each student who had been initially tested was again individually administered the Key Math. Grade scores were obtained and compared as a whole class and as individuals.

All the teachers were asked to respond to a series of questions (Appendix B), and record books were checked to assure that all cooperative lesson sheets had been turned in.

Implementation Calendar

June	Recruit teachers. Hand out article.
July	Acceptance of proposal
August	Develop initial lesson plans and attend training session.
September	Train teachers through modeling. Pretest students, gather data on individual students.
October	Institute specific math lessons using cooperative learning strategies. Turn lessons into university instructor for grade

	and feedback.
November	Monitor and assist at least weekly. Teach one class weekly.
April	Posttest students. Distribute teacher questionnaires.
May	Evaluate results. Write report.
June	Disseminate abstracts to cluster. Offer training workshops to schools.

CHAPTER V

RESULTS, RECOMMENDATIONS, AND DISSEMINATION

Results

Although 75% of the 47 total students in all six classes did not demonstrate mathematics progress equal to the six month treatment time, this was entirely attributable to the extremely poor showing of the two classes that were not closely monitored, whose average progress was only three months (Figure 1, class 3 and class 4). Analyzing the data gathered by pre and post testing all students using the Key Math, a criterion-referenced instrument, showed that the average growth in all other classes was more than the minimal six-month achievement criterion (see Figure 1). On the other hand, the total average advancement of all 47 participating students was 6.4 months, slightly over the objective criterion.

Viewing the achievement results in terms of the individual students within each classroom provided further positive evidence. Figure 2 illustrates that all nine students in class 1 progressed more than seven

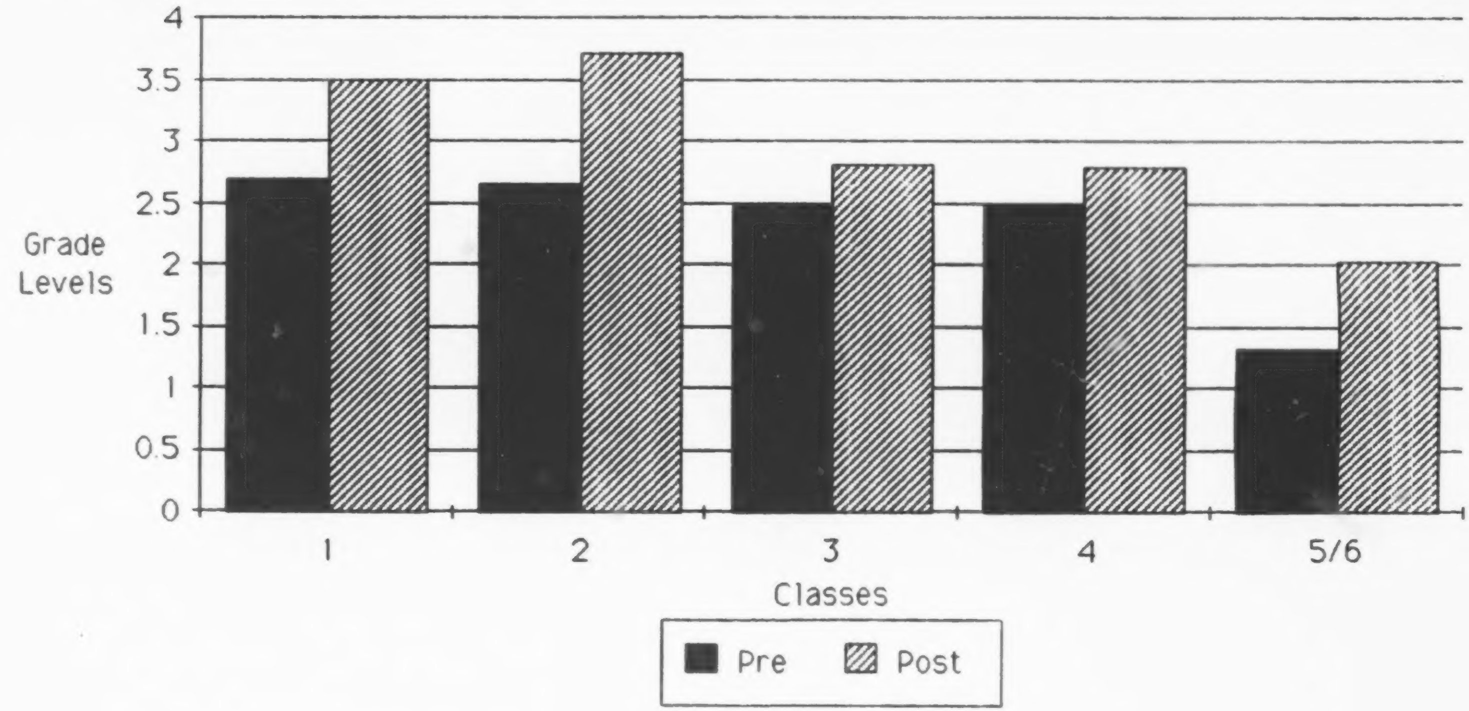

Figure 1. Average math grade levels in each class before and after cooperative learning.

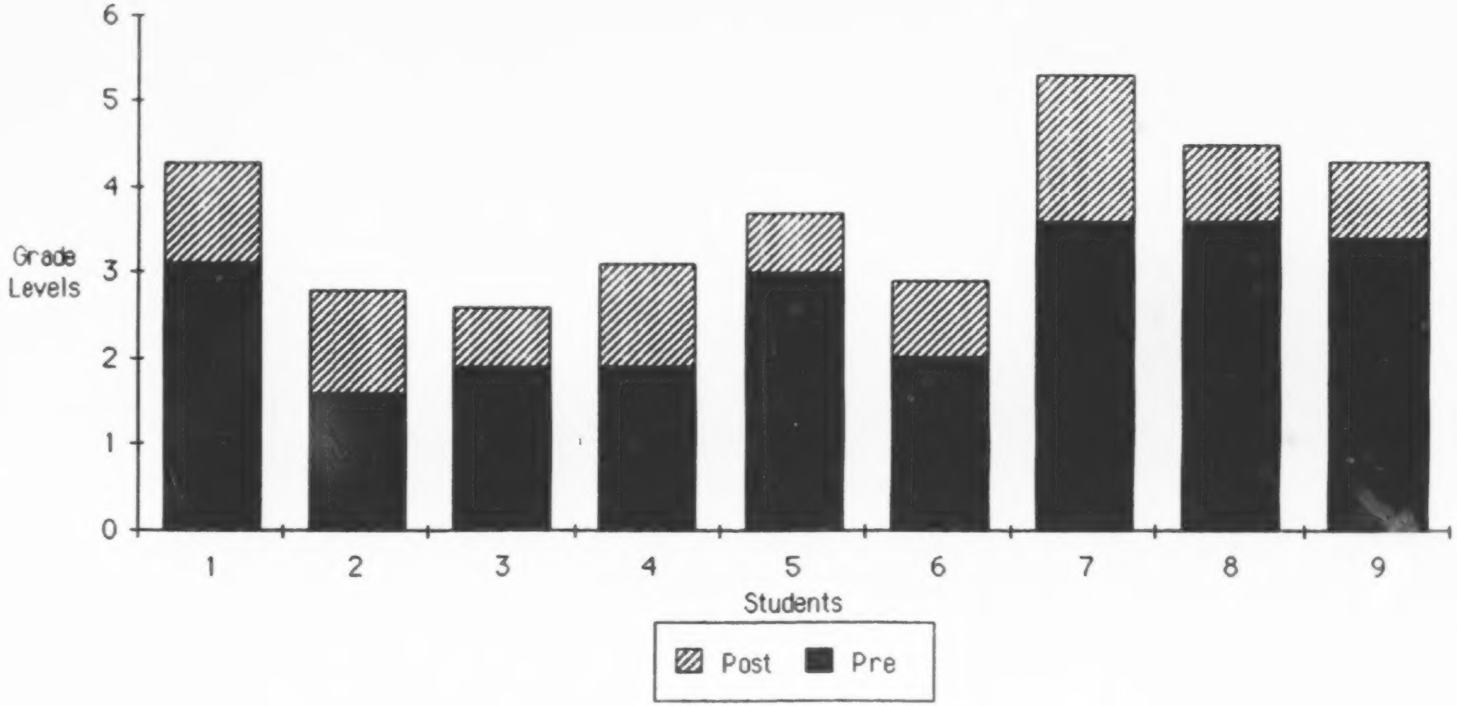

Figure 2. Math grade level of each student in class 1 before and after cooperative learning.

months, one obtained better than a year and a half growth, and four progressed more than a year. The 100% advancement easily exceeds the 75% growth objective.

Only one student in class 2 (Figure 3) did not make the six month advancement, he fell short by only one month, but three students advanced a year within the six-month implementation period. This equates to a 92% student growth rate in this class. Of the 17 children in the lower disability room (one student had been hospitalized for four months), four did not meet the objective (Figures 4 & 5). This means that 75% of the children in the two classes met the objective. These two classes were treated as one since the classes were taught together by one teacher. The division, purely arbitrary, was for visual clarification only.

In contrast, only one student in each of the other two classes made progress equivalent to the time spent in school, and it should be noted that one student is mainstreamed into regular education math. Figure 6 shows that two students' achievement was one month, another two gained three months, one advanced five, and one improved seven months. Similarly, Figure 7 demonstrates growth of one month for one student, two months for three students, one five, and one six months progress.

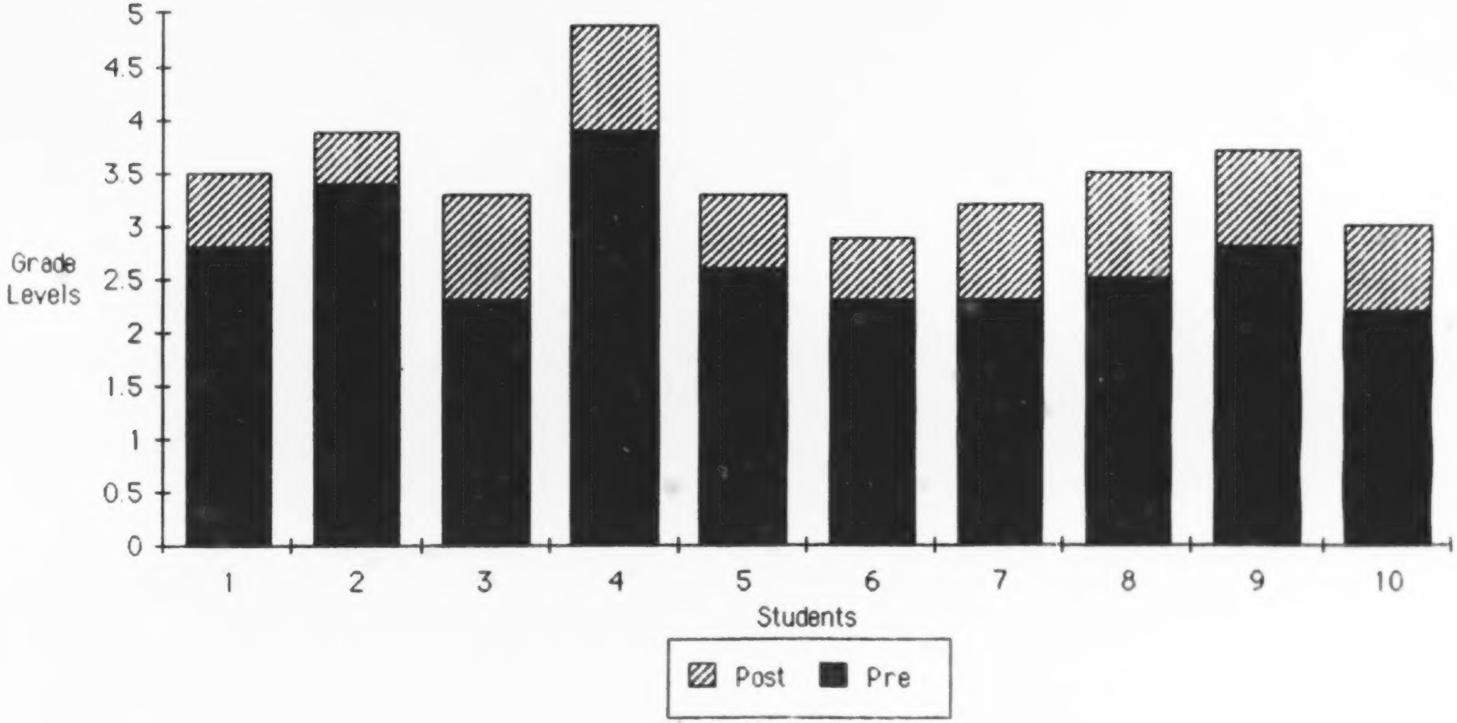

Figure 3. Math grade level of each student in class 2 before and after cooperative learning.

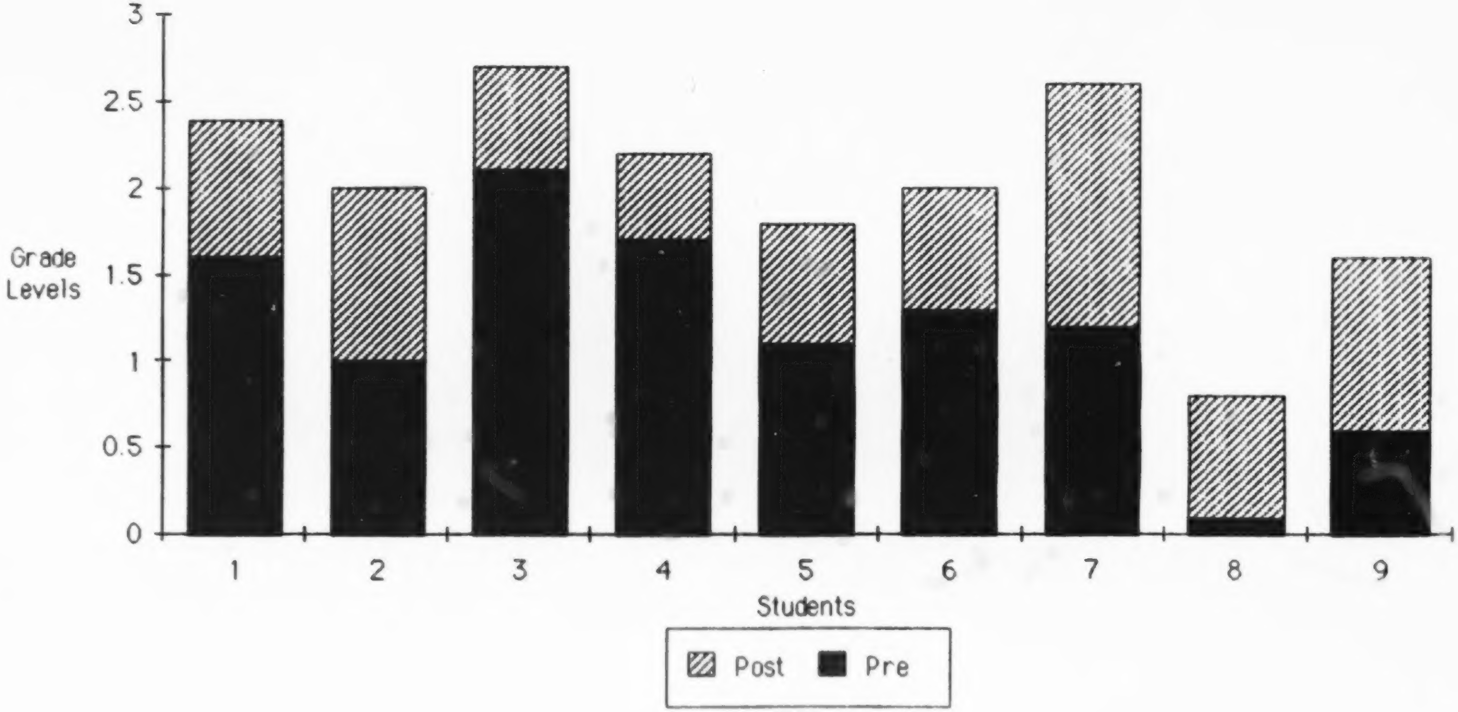

Figure 4. Math grade level of each student in lower learning disability class 3 before and after cooperative learning.

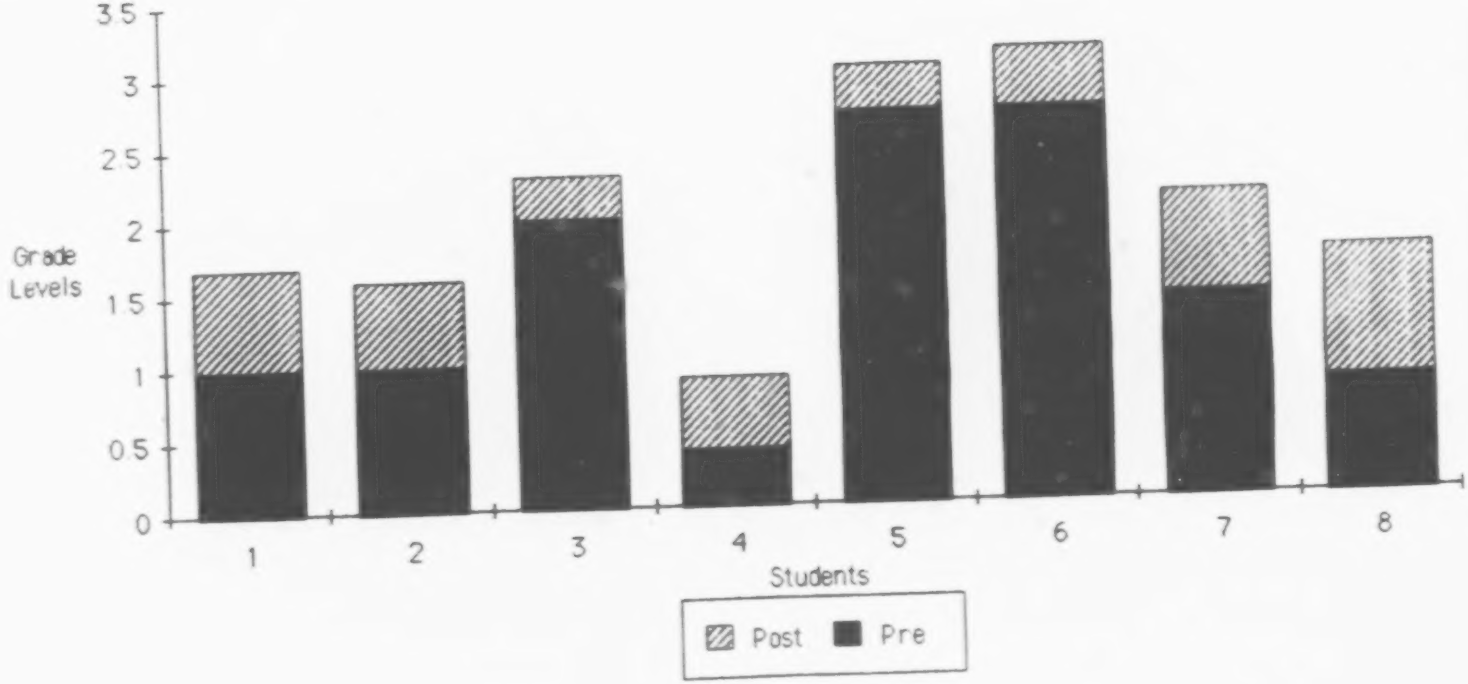

Figure 5. Math grade level of each student in lower learning disability class 4 before and after cooperative learning.

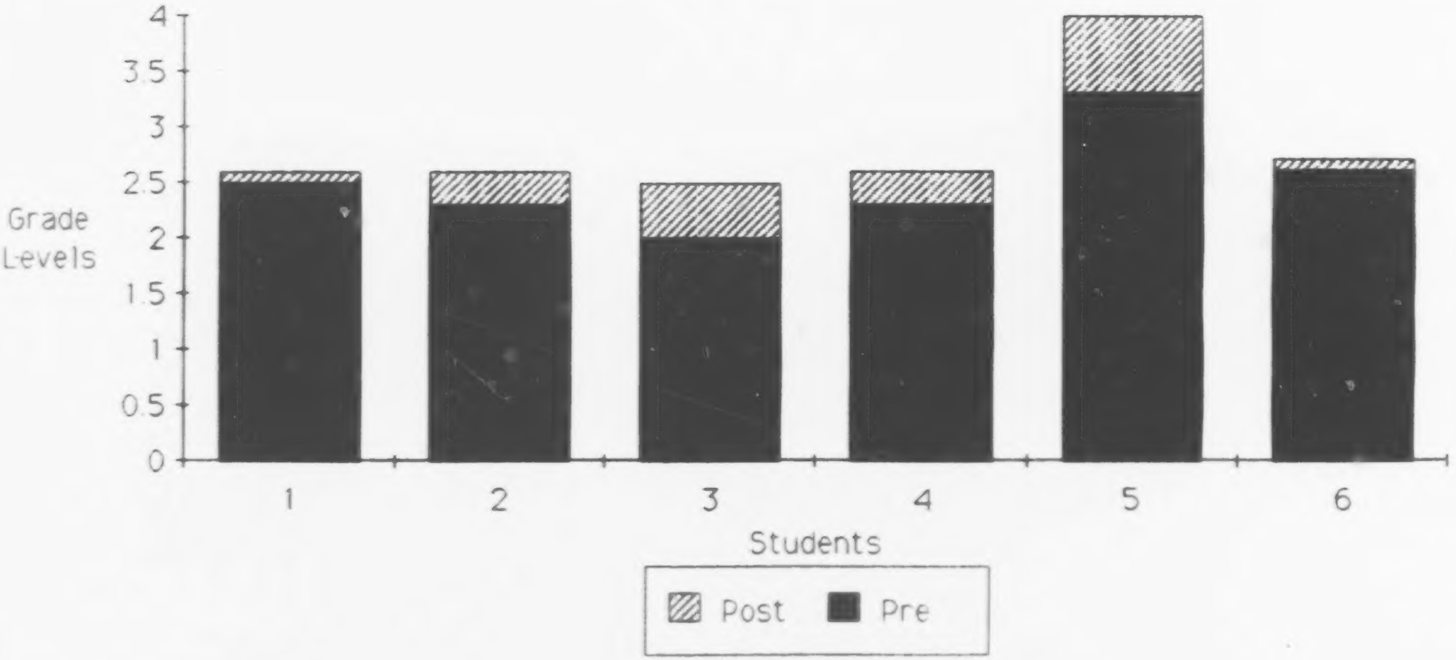

Figure 6. Math grade level of each student in class 5 before and after cooperative learning.

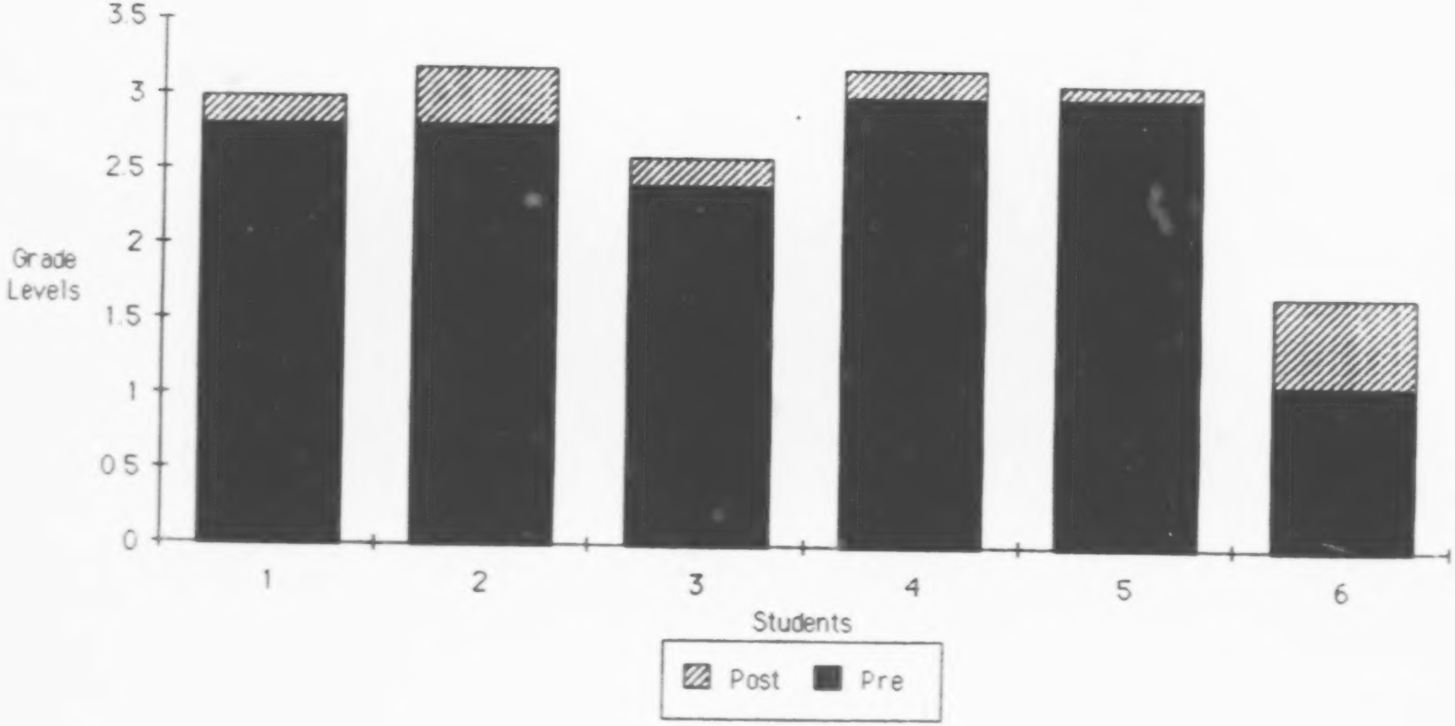

Figure 7. Math grade level of each student in class 6 before and after cooperative learning.

Using the target behaviors listed in Appendix A, subsumed under negative and positive groups revealed (Table 1) that the two frequently monitored upper learning disability classrooms (class 1 & 2) both decreased negative and increased positive behaviors. The lower elementary groups (class 5 & 6) engaged in less observable behaviors in general, and as a result decreased both positive and negative actions. In the other class (class 3) where pre and post-treatment data exists, there was virtually no change in either type of behavior. Class 4 had an preponderance of dissension and altercations. Using loud voices, and staying with the group, were not recorded because these behaviors were not exhibited in either observation situation.

All cooperative groups consistently turned in their group papers signed by all members. Although many times the assignment was incomplete, and not always correct, the effort and understanding of a collaborate venture was demonstrated.

Individual discussions with each of the five teachers using the questions in Appendix B revealed that all understood the basic tenets of interdependence and individual accountability. All teachers agreed that the children enjoyed the cooperative lessons, but that the social benefit far exceeded academic or cognitive gain.

Table 1

Total frequency of behaviors averaged per 5-minute interval under pre and post treatment conditions

	Behaviors			
	Positive		Negative	
Conditions	pre	post	pre	post
Classes				
1	1.7	13.3	6.3	3
2	11	15.3	4	1.3
3	7	2	6.5	2.3
4	a	5	a	14
*5&6	18.5	7.9	15	2

Note: [a]No data available
*Lower Learning Disability class

All claimed that they would use the technique again, and especially with subjects like science where 'brainstorming' is integral to the product. The lower elementary class teacher would have continued the lessons but a new administrator took over the building and gave rather stringent orders regarding course content. The three other teachers verbalized their willingness to continue alone. One teacher commented that the cooperative lessons were more effective when the consultant was available since demands of each group necessitated more adult assistance. One middle school learning disability teacher asked for assistance in instituting a cooperative learning program. Several students are now ready for mainstreaming.

As occasionally occurs, several unforeseen benefits resulted from this project. Basically, teachers, particularly special education teachers, are isolated in their private domains without new stimulation deriving from people interaction and new instructional materials and techniques. Not only did this project provide these opportunities, but the teachers began sharing with one another, using the psychologist as a conduit - even when they had never met the other teachers. In addition, the teachers' viewed this consultant as a helpmate rather than as a censor, and developed a camaraderie previously unknown, a departure from the generally prevalent isolation or alienation that exists between the disciplines. The same was true with the children, the frequent visits resulted in establishing a personal relationship between the students and the itinerant consultant. In addition, since only one set of materials per group were needed, more varied lessons were possible.

On the other hand, this was a heavy time drain on the part of all involved persons. Generally cooperative learning flourishes in environments that encourage innovation by offering additional support for the teachers' investment. Yet, this system is fighting for its very economic survival, and as a result many demands, extraneous to learning, are placed on the teachers, reducing their professional energy level.

Conclusions and Recommendations

In the four classes where cooperative lessons were consistently administered, documented progress was seen in both social skills and academic achievement. Although teachers were generally positive toward this technique, the total commitment needed for success requires continuous system-wide support. It is possible that the extreme progress in some instances was attributable to several additional variables, the greatest confounding factor seems to be the skill of the individual teacher. The more effective the teacher, the greater the students' progress, regardless of the technique used. In addition, perhaps more time had been devoted to on-task learning, and indeed some studies show that ongoing measurement procedures positively effect achievement through increased Active Learning Time (ALT)(Fuchs & Fuchs, 1986). Many of the students who participated are classified as learning disabled with specific deficits in auditory learning. Yet while the efficacy of a hands-on approach seems warranted, manipulatives had not been employed previously to the extent used in these cooperative lessons, and may account for some of the treatment success. Direct application of problem-solving strategies were built into the lesson sequence. Furthermore, the suggested lesson plans specifically encompassed a broad range of activities, mirroring regular education math objectives that may not have been covered in previous time spans.

Replication of this project should be most selective of the participating teachers since their expertise and commitment appear to be a crucial variable. Administrator sanction and cooperation should be elicited to provide teachers with positive reinforcement, and additional time. Most important, there should be a cadre of three of more teachers in each school to provide colleagial support. Johnson and Johnson (1987) assert that professional sharing, coplanning, and coevaluating are crucial to increasing professional competence. Also essential would be a longer duration devoted to training the involved personnel because the technique requires a great deal of knowledge, and generally taps techniques not in teachers' routine repetoire. In addition to the modeling approach used here, videotapes available through the Cooperative Learning Center could be obtained and viewed.

Since this special education target population tends to be more hyperactive, and occasionally less verbal than their peers, greater structure has traditionally been the situation of choice. This behavior, characteristic of the disability, was particularly obvious in the younger classroom. As a result, more student modeling seems warranted. Instead of growing more responsible for their peers' achievement, these students' overall interaction decreased and they became more dependent on the teacher and the high achiever in their group. This observation is supported by Lazarowitz, et. al (1989) who found that children who lived in cooperative communities exhibited more interactive behaviors in an active classroom.

Initially, one weekly cooperative lesson would seem sufficient. The collaboration could be maximized by selecting lessons that deal with math application rather than drilling facts. Teacher feedback and control with such a demanding population could be optimized by assigning one cooperative group at a time.

Dissemination

Cooperative learning is gaining acceptance in this school district as well as experiencing nation-wide interest. In order to provide experienced assistance to other schools, knowledge of this project will be spread by publishing an article in the teachers' union newspaper. The abstract will be shared with system supervisors, and the lesson plans will be duplicated and given to the math teachers in each building to stimulate their interest.

While volumes of research on cooperative learning is published yearly, little information on the application of this technique to categorical special education classrooms is available. For this reason, an article describing this project will be written and submitted to an appropriate journal.

Finally, an abstract of the report will be provided each cluster member and the lesson plans shared with anyone who expresses an interest. Abstracts will be mailed to the professors from the three universities who shared cooperative learning information with the writer, and a letter with the abstract enclosed will be sent to the Cooperative Learning Center.

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APPENDIX A

TARGET BEHAVIORS

Target Behaviors

Positive behaviors:

- Staying with group
- Deciding on turns
- Asking questions
- Explaining to group

Negative behaviors:

- Loud voices
- Negative remarks
- Off-task (tuning-out)

APPENDIX B

DISCUSSION QUESTIONS

Questions to Teachers

1. Did you feel the students gained from this experience? Cognitively, affectively, or both?

2. Would you use this technique again?

3. Was the additional effort worth the results?

4. Do you feel any of the students are now ready to reenter the mainstream?

5. Did this experience provide professional and/or personal satisfaction or stimulation for you?

6. Were the students motivated more than for traditional lessons?

7. Were you properly prepared? Would you seek additional training in this technique?

APPENDIX C

DEMONSTRATION LESSONS

Demonstration Lesson

Grade Level: **Lower Elementary Learning Disability Classroom**

Subject Area: Picture Puzzle- Building Visual Discrimination

Lesson Objective: Introduce Collaboration

Decisions:

1. Group Size: 3-4 (total class size 10-11)
2. Assignment to groups: stratified by ability
3. Room Arrangement: one student desk (for table space) with 2 chairs facing it.
4. Materials for each group: one ditto

Set the Lesson:

1. Task: Explain there are 5 things wrong with the picture and the group is to find as many as they can.
2. Positive Interdependence: One picture, everyone must agree, and everyone must be able to show the group's answer.
3. Individual Accountability: One member will be picked to show the group's answer.
4. Criteria for Success: Acceptable answers.
5. Expected Behaviors: Stay in group, use soft voices, everyone participate, use each other's names.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Process

1. Choose one student from each group to show answers.
2. Ask one student from each group: Did everyone talk? Did the talk have to do with the picture?

Evaluate

1. Task achievement. Was criterion met?
2. Did all individuals operate within the group?

Teacher Evaluation

1. Positive interactions witnessed in each group were related to class.
2. When student could not answer, the group was told to reexplain, and listen to the student's response.
3. All groups found the five things, each person could explain why, all signed the one paper, and there appeared to be no dissension.

Demonstration Lesson

Grade Level: **Upper Elementary Learning Disability Classroom**

Subject Area: Picture Puzzle- Building Visual Discrimination

Lesson Objective: Introduce Collaboration

Decisions:
1. Group Size: 3-4 (total class size 10-11)
2. Assignment to groups: stratified by ability
3. Room Arrangement: one student desk (for table space) and 2 chairs facing it.
4. Materials for each group: one ditto "Boxed Out 1" & pencil
5. Assigning roles: name the student recorder.

Set the Lesson:
1. Task: Explain there are 5 boxes at the bottom taken from the picture. Number as many as you can with the exact box number and letter from which it was taken.
2. Positive Interdependence: One picture, everyone must agree, and everyone must be able to show the group's answer.
3. Individual Accountability: One member will be picked to show the group's answer.
4. Criteria for Success: Acceptable answers.
5. Expected Behaviors: Stay in group, use soft voices, everyone participate, make eye contact.

Monitor
1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Process
1. Choose one student from each group to show answers.
2. Ask one student from each group: Did everyone talk? Did the talk have to do with the picture?

Evaluate
1. Task achievement. Was criterion met?
2. Did all individuals operate within the group?

3. Suggestion for next time.
   First allow group to solve problems before intervening

APPENDIX D

BLOCK PLANS

BLOCK PLAN FOR LOWER LEARNING DISABILITY CLASSROOM

Less advanced students will do the assignment with their group but be responsible for lower numbers (eg. counting and writing to 10, and sums only to 5)

Use 'free' time, homework, etc. for additional practice. Students can be homogeneously grouped to work at their own level on those assignments

Unit 1 Numeration

Day 1	Objective: Counting objects 0-9 Task: a) Teacher directs counting 'bear' counters
Day 2	Noncooperative Objective: Rote counting to 10, 15, 20, 100 Task: Oral drill, cooperative or noncooperative as teacher prefers.
Day 3	Objective: Writing numerals 0-9 Task: Count pictures and write number
Day 4	Noncooperative Objective: Practice writing numerals Task: Teacher's choice
Day 5	Objective: Recognizing number sequence Task: Dot to dot ditto
Day 6	Objective: Finding numbers just before and just after Task: Fill in ditto with missing numbers/ walk on number line
Day 7	Noncooperative lesson: Objective: Facility with rote counting Task: Have students practice counting forward and/or backwards depending on level of competence
Day 8	Objective: Recognizing numbers out-of-sequence Task: Spinner with numbers 0-9
Day 9	Noncooperative lesson: Objective: Developing competence with writing numerals Task: Teacher's choice

Day 10 Objective: Recognizing numbers 1-20
Task: Playing bingo

UNIT II ADDITION FACTS SUMS TO 10(5)

Day 1	Objective: Demonstrate meaning of number sentences Task: Use "bear" counters and place amount directly on ditto sentences
Day 2	Noncooperative Objective: Build facility with number recognition Task: Students work according to ability. Practice counting and naming numbers, 0-100.
Day 3	Objective: Generate and represent number sentences Task: Students take (5)10 "bears", count out 2 groups and write the 2 numbers, then push them together and count the 'sum'. Copy numbers on paper.
Day 4	Objective: Understanding different addition possibilities Task: Take 5(10) lima beans, painted black on one side. Toss and write down the # white, black, and total
Day 5	Objective: Build familiarity with number sentences Task: Students write 2 numbers under (5)10(20) and count "bears" and write sum
Day 6	Objective: Understanding equivalency Task: Fill in all three missing elements in addition number sentences. Use "bears" to check
Day 7	Objective: Understanding equivalency Task: Fill in missing addend and sum, horizontal & vertical Take turns checking with balance scale
Day 8	Noncooperative Objective: Understanding equivalency Task: Dittos according to skill level. Sums to 5,10,20.
Day 9	Objective: Internalizing addition number facts (property of zero) Task: Train in use of cards.

Day 10	Objective: Practice use of flash cards Task: Students drill one another or themselves
Day 11	Objective: Internalize sums to 5, 1 + N. Task: Drill with flash cards
Day 12	Objective: Counting by 2's, starting with 2 Task: Oral counting to one another
Day 13	Noncooperative Objective: Writing even numbers Task: Ditto
Day 14	Objective: Counting by two's, odd numbers Task: Oral counting to one another
Day 15	Noncooperative Objective: Writing odd numbers Task: Ditto
Day 16	Objective: Practice counting by 2's using even numbers Task: Ditto
Day 17	Objective: Practice counting by 2's using odd numbers Task: Oral Drill
Day 18	Objective: Facility adding N + 2 Task: Ditto-horizontal and vertical problems
Day 19	Objective: Counting by 2's, beginning with any number Task: Oral Drill
Day 20	Objective: Writing numerals by 2's Task: Take turns on ditto
Day 21	Objective: Writing numerals by 3's Task: Ditto
Day 22	Objective: Internalize sums, N + 2. Task: Practice with flash cards
Day 23	Objective: Internalize sums N + 3 Task: Practice with flash cards

Day 24 Objective: Practice writing number facts to 5(10)
Task: ditto

Day 25 Individual ditto

UNIT SUBTRACTION FACTS SUMS THROUGH (5) 10

Day 1	Objective: Demonstrate meaning of subtraction Task: Use bears, take away given # from group, write leftover #. Fill in ditto
Day 2	Objective: Practice with subtraction Task: Take a pile of 'bears', split into 2, and write action on paper.
Day 3	Objective: Practice with missing elements. Task: Ditto with missing elements.
Day 4	Objective: Subtraction as inverse of addition Task: Take away one addend from sum to find missing addend (e.g. ? + 2 = 3 is 3-2+?) Use "bears" and change addition on ditto to subtraction
Day 5	Objective: Written inversion of addition sentences Task: Ditto with addition sentences with missing addend. Change to subtraction, find answer and fill in.
Day 6	Objective: Practice converting number facts to subtraction Task: Ditto
Day 7	Objective: Internalize subtraction facts, N-0, N-1. Task: Count backwards by 2's.
Day 8	Objective: Practice with subtraction facts Task: Ditto with missing numbers
Day 9	Objective: Count backwards in descending patterns by 5's Task: Oral practice
Day 10	Objective: Count backwards inm descending patterns by 10's Task: Ditto with missing numerals
Day 11-13	Objective: Internalize suntraction facts to 5, (10) Task: Use flash cards

UNIT III TIME

Day 1	Objective: comprehending time interval Task: One child watches clock. 2 others with backs to clock stand up after their estimate of 10, 20, 30 seconds, and check to see if accurate. Take turns.
Day 2	Objective: Comprehending 5-10 minute intervals Task: While doing other lesson,(making clocks from paper plates) call attention to time and set alarm (kitchen timer) . Look at clock when rings. Repeat at various intervals.
Day 3	Objective: Observe movement and direction of hands on standard clock face. Task: During another cooperative lesson (dittos with hands on the hour) set alarm for 5 minute interval, place hands in position on cardboard clocks, and draw on ditto. When rings, draw new position.
Day 4	Objective: Understanding function of 2 hands Task: Use face dittos of previous day and write observations of position of change of 2 hands from 5 minute intervals. Write (or tell) conclusions.
Day 5	Objective: Name hour and minute hand Task: Draw hands on ditto of clock face
Day 6	Objective: Associate movement of minute hand to tell time in 5 minute intervals Task: Alternate clock faces filled in. Students complete blank ones in five minute sequence.
Day 7	Objective: Practice associating minute hand to five minute intervals. Task: Alternative clock faces to be filled in. Random times.
Day 8	Objective: Name the time-hour only Task: Remove minute hand on cardboard clock or tape down. Spin hour hand and indicate position on ditto

UNIT LINEAR MEASUREMENT

Day 1	Objective: Identify length of objects using qualitative terms- wide, long, short, high Task: Show assortment of objects to group. Place in bag. Take turns blindly feeling and describing. Others guess what it is.
Day 2	Objective: Determine length of objects using nonstandard units Task: Using thumbs, button, hand, say how many and which of the 3 is most appropriate. Measure several objects.
Day 3	Objective: Estimation Task: Guess how many buttons long, and check accuracy
Day 4	Objective: Determine height and length using standard units Task: Measure body parts of each other, draw the part, and length or height in appropriate unit
Day 5	Objective: Identify reasonable customary unit to use for length Task: Using an inch, rular, yardstick, measure a piece of string, a stick, desk, etc.

CALENDAR UNIT

Day 1	Objective: Indentify events that occur during morning, afternoon, and night Task: Show assortment of pictures with activities and have students respond.
Day 2	Objective: Use calendar as number chart Task: Ditto with number questions. e.g. what number comes before 8, how many days
Day 3	Objective: Use calendar to name months, and days. Task: Take turns reciting. Play Saturday Love by the Shirrelles.
Day 4	Objective: Master number of days in each month Task:Teach poem, Thirty days has September, also trick with knuckles.
Day 5	Objective: Construct Calendar from grid Task:Fill in days, month, and dates.
Day 6	Objective: Mark events on calendar Task: Use current month and illustrate.

MONEY UNIT

Day 1	Objective: Visual discrimination of 4 coins Task: Each student sorts coins from an array
Day 2	Objective: Learn value and relationship of 2(4) coins Task:Fold paper into quadrants, label name and value in cents. Place the assortment of coins in proper square
Day 3	Objective: Understand relationship between coins Task: Fold paper into 8 parts, label each in the following order: 2,5,10,8,13,16,20,25. Select the corrects coins for each and record the coin's value.
Day 4	Objective: Relate coins to concrete objects Task: From an assortment of objects priced under $1.00, select and record correct coins for each.
Day 5	Objective: Add more than one money value less than $1.00 Task: Pick 2 objects and compute total by selecting and recording coins.
Day 6	Objective: Make change from purchases less than $1.00. Task: Using only quarters, purchase an object and take change from the kitty.

BLOCK PLAN FOR UPPER LEARNING DISABILITY CLASSROOM

Less advanced students will do the assignment with their group but are responsible for lower numbers (e.g. counting and writing to 10, and sums only to 5).

'Free' time, homework may be used for additional practice. Students can be grouped homogeneously to work at their own level during noncooperative times.

UNIT I ADDITION FACTS SUMS THROUGH 10

Day 1	Objective: Generate number sentences from manipulatives Task: Place counters directly on numbers on ditto, make 2 piles of counters, write numerals, push together and write sum.
Day 2	Noncooperative Objective: Translate sets on ditto into numerals Task: Count sets separately and together
Day 3	Objective: Missing elements in addition sentences Task: Use counters and fill in input/out/sums
Day 4	Noncooperative Objective: Practice missing elements, sums to 5(10) Task: Fill in ditto
Day 5	Objective: Internalize sums, 0+N. Task: Drilling procedure with flash cards
Day 6	Objective: Internalize sums to 10, 0 + N, 1 + N Task: Drill procedure with flash cards
Day 7	Noncooperative Objective: Writing numbers to 10, 20, or 100, by 2's Task: Write odd numbers in ascending order, then even starting from various numbers.
Day 8	Objective: Internalize doubles, 3 + 3, 4 + 4, 5 + 5 Task: Drill with flash cards, mix with prior facts

Day 9	Noncooperative Objective: Writing number sentences, sums to 10 Task: Fill in missing elements, or generate own sentences, format both horizontal and vertical
Day 10	Objective: Memorize last 6 facts, sums to 10/or extrapolate from known facts (e.g. 4 + 3 =3 + 3 +1, or 4 is 2-2's) Task: Drill with all flash cards using all missing elements
Day 11	Objective: Fill in missing elements in number sentences, vertical and horizontal, sums to (5)10. Task: Ditto
Day 12	Noncooperative Objective: Demonstrate mastery of addition facts sums to (5)10. Task: Individual written timed test

UNIT II SUBTRACTION FACTS SUMS THROUGH (5)10

Day 1	Objective: Demonstrate meaning of subtraction Task: Use manipulatives(bears, counters), take away given # from group to find "answers" (e.g. 5-3=__)on ditto Task: Take a pile and split the pile into 2. Transfer the action into written # sentence.
Day 2	Noncooperative Objective: Fill in missing elements Task: Ditto
Day 3	Objective: Subtraction as inverse of addition Task: Take away one addend from sum to find missing addend (e.g.? + 2 = 3 is 3 - 2 = ?) Use manipulatives, if necessary, and change addition on ditto to subtraction.
Day 4	Objective: Written inversion of addition sentences Task: Write addition sentences (sums to 10(5) with or without a missing addend, and transpose to subtraction (e.g. 1 + ? = 4 4-1=3) to find answer
Day 4	Noncooperative Objective: Written inversion of subtraction sentences Task: Ditto
Day 5	Objective: Internalize subtraction facts, N-0, N-1. Task: Count backwards and review property of 0, then use flash cards.
Day 6	Noncooperative Objective: Count backwards by 2's, by 5's, 10's. Descending patterns Task: Oral practice/ or ditto with missing #'s
Day 7	Objective: Internalize subtraction facts to (5)10, N-2, N-10. Task: Use flash cards
Day 8	Objective: Memory strategy subtraction as inverse of addition Task: Flash cards with addition, students invert 2 ways (e.g.2+3=5 is 5-3=2 or 5-2=3.

Day 9 Noncooperative
Objective: Written mastery of subtraction facts.
Task: Individual timed test

UNIT III **PLACE VALUE** (tens and ones)

Day 1
Objective: Illustrate groups of one's and 10's
Task: 500-1000 sticks, count and and tie into bundles of 10's, and one's.

Day 2
Objective: Representing ones and tens
Task: Container with bundles of tens and singles. One student hands another an assortment, 2nd student writes numerals on paper folded vertically into 3 columns and labeled 10's, ones,and 3rd student checks by writing total numeral.

Day 3
Objective: Representing written numeral using concrete objects
Task: Take bundles of sticks and place in proper column.(opposite of Thursday's lesson)

Day 4
Noncooperative
Objective: Recognizing number symbols for tens and ones.
Task: Circle on ditto in red all tens column numerals, blue all ones. Expand by mixing some 3 digit numerals in.

UNIT IV ; ADDITION, 2 DIGITS + I DIGIT, 2 DIGITS + 2DIGITS

Day 1	Objective: Concretize addition sentence Task: Take turns taking bundles, writing the numerals, then taking more bundles, adding them together and writing the sum in the column.
Day 2	Noncooperative Objective: Practice adding and subtracting 2-digits and one digit (no regrouping). Task: Complete ditto
Day 3	Noncooperative Objective: Practice adding and subtracting 2-digits with 2 digits(no regrouping) Task: Ditto
Day 4	Objective: Assess place value and addition without regrouping Task: Ditto test

UNIT V ADDITION FACTS, SUMS THROUGH 20

Day 1	Objective: Memory strategies for addition facts with 10 as addend Tasks: Flash cards or dittos. (change by 1 in tens place)
Day 2	Noncooperative Objective: Review counting backwards Task: Teacher directed, class recitation
Day 3	Objective: Memory strategies for addition with 9 as addend.(one less than 10 +) Task: Ditto as stimulus, students make their own.
Day 4	Objective: Review counting by 2's. Task: Dot-to dot using odd numerals.
Day 5	Objective: Addition facts with 4 as addend (N + 4=N+2+2) Task: Flash cards
Day 6	Objective: Memory strategies for doubles Task: Flash cards
Day 7	Noncooperative Objective: Using known facts to derive unknown (one more, one less, double and one more, etc.) Task: Practice
Day 8	Noncooperative Objective: Assess speed of addition Task: Ditto test

Unit VI SUBTRACTION FACTS, SUMS THROUGH 20

Day 1	Objective: Review inverse relation of addition and subtraction. Task: Take away one addend from sum to find missing addend (e.g.? + 9 = 18 is 18 - 9 = ?) Use manipulatives, if necessary, and change addition on ditto to subtraction
Day 2	Objective: Written inversion of addition sentences Task: Write addition sentences (sums to 10(20) with or without a missing addend, and transpose to subtraction (e.g. 6 + ? = 14 14 - 6 =7) to find answer
Day 3	Objective: Practice subtraction facts Task: Ditto
Day 4	Objective: Review counting backwards Task: Oral drill
Day 5	Noncooperative Objective: Practice subtraction facts Task: Ditto
Day 6	Objective: Assess subtraction facts to 20 Task: Timed test
Day 7	Objective: Regroup ones and tens Task: Use bundles of sticks and ditto
Day 8	Objective: Practice regrouping ones and tens Task: ditto

Unit VII Place Value- Hundreds

Day 1	Objective: Representing ones and tens and hundreds Task: Container with bundles of tens and singles. Take 10 bundles of tens and tie together 2-3 groups. One student hands another an assortment, 2nd student writes numerals on paper folded vertically into 4 columns and labeled 100's, 10's, ones, and 3rd student checks by writing total numeral
Day 2	Objective: Converting written numeral into concrete objects Task: Take bundles of sticks and place in proper column.(opposite of Thursday's lesson)
Day 3	Noncooperative Objective: Recognizing number symbols for hundreds tens and ones Task: Circle on ditto in green all hundreds, in red all tens column numerals, blue all ones
Day 4	Objective: Concretize addition sentence Task: Take turns taking bundles, writing the numerals, then taking more bundles, adding them together and writing the sum in the column
Day 5	Noncooperative Objective: Practice adding and subtracting 2 digits and one digit Task: Complete ditto
Day 6	Noncooperative Objective: Practice adding and subtracting 2-digits with 2 digits Task: Ditto
Day 7	Objective: Assess place value and addition with regrouping Task: Ditto test

UNIT III TIME

Day 1	Objective: comprehending time interval Task: One child watches clock. 2 others with backs to clock stand up after their estimate of 10, 20, 30 seconds, and check to see if accurate. Take turns.
Day 2	Objective: Comprehending 5-10 minute intervals Task: While doing other lesson,(making clocks from paper plates) call attention to time and set alarm (kitchen timer) . Look at clock when rings. Repeat at various intervals.
Day 3	Objective: Observe movement and direction of hands on standard clock face. Task: During another cooperative lesson (dittos with hands on the hour) set alarm for 5 minute interval, place hands in position on cardboard clocks, and draw on ditto. When rings, draw new position.
Day 4	Objective: Understanding function of 2 hands Task: Use face dittos of previous day and write observations of position of change of 2 hands from 5 minute intervals. Write (or tell) conclusions.
Day 5	Objective: Name hour and minute hand Task: Draw hands on ditto of clock face
Day 6	Objective: Associate movement of minute hand to tell time in 5 minute intervals Task: Alternate clock faces filled in. Students complete blank ones in five minute sequence.
Day 7	Objective: Practice associating minute hand to five minute intervals. Task: Alternative clock faces to be filled in. Random times.
Day 8	Objective: Name the time-hour only Task: Remove minute hand on cardboard clock or tape down. Spin hour hand and indicate position on ditto

Day 9	Objective: Name time to nearest 5 minute segment Task: Position hands to show time
Day 10	Objective: Name time to nearest 5 minutes varying both hands Task: Spin both hands on cardboard clock, and indicate position on ditto and write time
Day 11	Objective: Represent real time Task: Ditto with pictures or description of daily events. Draw clock with correct hand positions, and write time.

UNIT LINEAR AND VOLUME MEASUREMENT

Day 1	Objective: Identify length of objects using qualitative terms- wide, long, short, high Task: Show assortment of objects to group. Place in bag. Take turns blindly feeling and describing. Others guess what it is.
Day 2	Objective: Determine length of objects using nonstandard units Task: Using thumbs, button, hand, say how many and which of the 3 is most appropriate. Measure several objects.
Day 3	Objective: Estimation Task: Guess how many buttons long, and check accuracy
Day 4	Objective: Determine height and length using standard units Task: Measure body parts of each other, draw the part, and length or height in appropriate unit
Day 5	Objective: Identify reasonable customary unit to use for length Task: Using an inch, rular, yardstick, measure a piece of string, a stick, desk, etc.
Day 6-10	Specific words used in strands. Repeat 1-5
Day 11	Objective: Draw line segments for given whole unit lengths Task: Each do own and compare e.g. on ditto, draw 6 inches, draw 2 inches, etc.
Day 12	Objective: Concrete experience with volume measurement Task: Make microwave brownies

CALENDAR UNIT

Day 1	Objective: Indentify events that occur during morning, afternoon, and night Task: Show assortment of pictures with activities and have students respond.
Day 2	Objective: Use calendar as number chart Task: Ditto with number questions. e.g. what number comes before 8, how many days
Day 3	Objective: Use calendar to name months, and days. Task: Take turns reciting. Play *Saturday Love* by the Shirrelles.
Day 4	Objective: Master number of days in each month Task:Teach poem, *Thirty days has September*, also trick with knuckles.
Day 5	Objective: Construct Calendar from grid Task:Fill in days, month, and dates.
Day 6	Objective: Mark events on calendar Task: Use current month and illustrate.
Day 7	Objective: Apply knowledge of calendar Task: logic puzzle. ditto with clues. e.g. 1)not a Monday 2) not the third week 3) no 7 in it 4) not an even number
Day 8	Objective: Apply knowledge of calendar Task: Ditto with questions about the month. e.g.one month is how many weeks?
Day 9	Objective: Apply knowledge of calendar Task Alternate questions and puzzle

MONEY UNIT

Day 1	Objective: Learn value and relationship of 2(4) coins Task:Fold paper into quadrants, label name and value in cents. Place the assortment of coins in proper square
Day 2	Objective: Understand relationship between coins Task: Fold paper into 8 parts, label each in the following order: 2,5,10,8,13,16,20,25. Select the corrects coins for each and record the coin's value.
Day 3	Objective: Relate coins to concrete objects Task: From an assortment of objects priced under $1.00, select and record correct coins for each.
Day 4	Objective: Add more than one money value less than $1.00 Task: Pick 2 objects and compute total by selecting and recording coins.
Day 5	Objective: Make change from purchases less than $1.00. Task: Using only quarters, purchase an object and take change from the kitty.
Day 6	Objective: Reinforce knowledge of and relationship of bills. Task: Fold paper into quadrants, label $1,$5,$10,$100. Using monopoly money, place bills in correct quadrant.
Day 7	Objective: Relate value of coins and bills. Task: Write the following amounts on a paper folded into 8 parts:$1.25,$1.50,$1.15,$2.27, $2.10,$5.05,$5.22,$6.15. Choose appropriate coins and bills, and record in section.
Day 8	Objective: Relate coins and bills to concrete objects. Task: Select objects and choose correct assortment of money.Record the money selected and the total value.

Day 9	Objective: Add more than one money value over $1.00. Task:Pick 2 objects and compute total cost by selecting and recording bills and coins.
Day 10	Objective: Make change from purchases over $1.00. Task: Using only bills to purchase, purchase an object and take change in coin from kitty.

APPENDIX E

SAMPLE DAILY PLANS

MATH

NUMERATION UNIT
Counting and Identifying Numbers

Lower Elementary Learning Disabled Categorical Classroom

Grade Level Range: Predominantly kindergarten through second grade achievement levels.

Class will be divided into three groups consisting of three and four members. Students will be continuously assigned to the same base group stratified by ability according to performance on the Key Math Test.

Each group will be seated in individual chairs arranged around one student desk.

Lesson One

Lesson Objective: Counting objects 0-9
- a) counting out
- b) one-to-one correspondence

Materials for each group.
1. 9 colored counters. (plastic bears, cubes, etc.)
2. ditto and one pencil

Set the Lesson. Teacher explains, states, or demonstrates:
1. Tasks.
   - a) step-by-step teacher directed. Ask group to count out 6 counters, check it, repeat with 7, 8, 9, 10.
   - b) Give out dittos with pictures of objects, take turns counting
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.
5. Criterion for success. Number symbols must accurately represent objects.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices.

Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Teacher Evaluation

1. Since each student wished to demonstrate his/her skill, most wished to have a turn explaining to the teacher. Those who goofed were turned back to the group. At times, students were seen prompting their peers, and the less advanced were actually looking to the others for surreptious help.

Lesson Two

Lesson objective: Counting objects 0-9
- a) one-to-one correspondence
- b) one-to-one correspondence with writing

Materials for each group.
1. ditto with objects only

Set the Lesson. Teacher explains, states, or demonstrates:
1. Tasks.
   - a) Give out dittos with objects, take turns counting
   - b) Give out ditto with objects to count out and write the numerical answer
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.
5. Criterion for success. Number symbols must accurately represent objects.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor
1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading
1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Evaluation
1. One student could not count past 10, another could not coordinate her hand and voice. Other

students rehearsed the two without progress. Teacher suggested homework and additional one-to-one instruction. Criteria for the two should only be mastery 0-10, whereas the counting lesson was extended through 20, and even 50 for those students who could handle it.

2. Helpful student actually held the finger to guide the student.
3. The students took turns counting, writing, and signing their names. In this way the student who could not write numbers yet had a model to follow.

Lesson Three

Lesson Objective: Recognizing number sequence

Materials for each group.

1. dot to dot ditto with numbers and pencil

Set the Lesson. Teacher explains, states, or demonstrates:

1. Tasks.
   a) Give out ditto with numbers to count out and connect.
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.
5. Criterion for success. Number symbols must accurately represent objects.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Teacher evaluation

1. Students took turns counting, then drawing lines. Another group took turns drawing lines in segments of 3 or more.
2. When one student had difficulty following the numbers because some were indistinct, one student spontaneously darkened the problem

numbers as an assist.

3. The low student in each group still experienced difficulty.
4. Colleague took a base line.
5. For the more capable students, a ditto with numbers through 80 was given.

Lesson Four

Lesson Objective: Finding numbers just before and just after

Materials for each group.

1. ditto with numbers and pencil

Set the Lesson. Teacher explains, states, or demonstrates:

1. Task. Give out ditto(s) with numbers missing and fill in.
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.
5. Criteria for success. Number symbols must accurately represent objects.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Lesson Five

Lesson Objective: Recognizing numbers out-of-sequence, 0-9

Materials for each group.
1. Spinner with numbers

Set the Lesson. Teacher explains, states, or demonstrates:

1. Task.
   Spin and name number
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is spinner, one responder, and one checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.
5. Criteria for success. Students can name all numbers on spinner.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor
1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading
1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain and demonstrate 2-3 answers.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Lesson Six

Lesson Objective: Recognizing numbers out-of-sequence, 0-20

Materials for each group.

1. Bingo cards with numbers
2. Cover ups

Set the Lesson. Teacher explains, states, or demonstrates:

1. Task.
   Teacher calls number, cover it up
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is finder, one cover upper, and one checker. Can alternate roles.
4. Goal interdependence. First group to bingo wins.
5. Individual accountability. One member randomly picked to demonstrate group's product.
6. Criteria for success. Only numbers called covered up.
7. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain and demonstrate 2-3 answers.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to find numbers.

MATH

ADDITION UNIT
Addition Facts, Sums through 5 or 10

Upper Elementary Learning Disabled Categorical Classroom
Grade Level Range. Predominantly second through third grade achievement levels.

Class will be divided into three groups consisting of three and four members. Students will be continuously assigned to the same base group stratified by ability according to performance on the Key Math Test.

Each group will be seated in individual chairs arranged around one student desk.

Lesson One

Lesson Objective: Use manipulatives to make additions and represent in number sentences

Materials for each group.

1. 10 colored counters. (plastic bears, cubes, etc.)
2. paper and one pencil

Set the Lesson. Teacher explains, states, or demonstrates:

1. Tasks. Demonstrate meaning of addition using manipulatives and transfer to written representation in horizontal number sentences.
   a) Give out dittos with 5 number sentences. Ask student to place counters on addends, push together and count. Leave them there, and repeat for next problem. Write number answer.
   b) Have students make two piles, represent in numbers, then push piles together and count sum. Complete number sentence. Repeat as time allows.
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.

5. Criteria for success. Number symbols must accurately represent objects.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed, eg. reminders of inappropriate behaviors. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.
3. Expand task if students' grasp objective easily.
4. If one student fails to explain adequately, turn it back to the group. Task is finished only when all can perform criterion.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.
4. Choose one student to say something positive. Remind students never to say, "I, he, them", only use "the Group" as sentence subject.

Teacher Evaluation

1. Groups became argumentative, among themselves and between groups, so collaborative behavior was modeled. Groups in one class were seated father apart.
2. One group argued about who was to sit in the one desk. When they were unable to resolve the conflict, even after they had lost they reward, suggestions were made by the teacher. Odds and evens were played to determine turns, and it was suggested that each lesson they move around the desk of the student whose turn it was.
3. Base group was changed in one class because two students out of the three were extreme.

Lesson Two

Lesson Objective: Fill in missing elements in addition number sentences

Materials for each group.
1. 10+ colored counters. (plastic bears, cubes, etc.)
2. ditto paper and one pencil

Set the Lesson. Teacher explains, states, or demonstrates:
1. Task. Fill in missing input/output in horizontal number sentences, using sums through 5(10). Demonstrate each with the counters.
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Reward interdependence. A treat was obtained by each group that worked well together.
4. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
5. Individual accountability. One member randomly picked to demonstrate group's product.
6. Criteria for success. Number symbols must accurately represent objects.
7. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately. Stay on task.

Monitor
1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading
1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.
4. Absent students will be brought up-to-date by their base group when they return.

5. Teacher brought out a number balance and groups took turns using it, emphasizing the equivalency property.
6. Lesson was expanded since students quickly grasped the idea.

Teacher Evaluation

1. One very argumentative group was left to swing slowly in the wind. Eventually, one cried, they covered up, and smoothed it out.
2. Students were told they were going to stay together, despite their disagreements. Some suggestions were made, but it was obvious their own repetoire contained solutions, they were simply attempting to manipulate, and not trying to cooperate. Teacher's patience had to be reinforced in more than one class.
3. In two of the classes, two students were disruptive to the process because there was a student in each group that was a social isolate. Acceptance of group responsibility, without escape was stressed. In one class the teacher has an ongoing point chart, and the two successful groups each earned a point.
4. All students appeared to grasp the ojective, and it was noted that the slower students enjoyed the peer attention and their own expertise in explaining the work to their groups.
5. Two students devised a scheme to demonstrate equivalency using their hands as receptacles and were asked to demonstrate their method to other groups.
6. When students who were monitored could not demonstrate the concept, the group was asked to explain it to them.

Lesson Three

Lesson Objective: Internalize sums to 5, 0 + N.

Materials for each group.
1. cards with number sentences

Set the Lesson. Teacher explains, states, or demonstrates:
1. Task. Use property of zero and commutative law. (eg. 4 + 0=4, 3 + 0 = 3, 0 + 3 = 3). Show with counters. Oral drill. Role play the procedure as follows:
   - Step 1: Driller reads number fact sentence from card with answer, repeats leaving out answer. Drillees repeat whole sentence with answer.
   - Step 2: Driller repeats process but leaves out one input number. drillees respond with complete sentence fact.
   - Step 3: process repeated with other addendum.
   - Step 4: Driller takes next number fact set and repeats steps 1-3. Continue until all 5 sets are presented.
   - Step 5: Driller shuffles cards and presents again.
2. Positive interdependence. Each group has one set of materials,and all must master the facts. Each student must be able to respond to the cards.
3. Role interdependence. One student is the 'driller' and the other two are the 'drillees'. Alternate roles.
4. Individual accountability. One member randomly picked to demonstrate skill.
5. Criteria for success. Students must quickly respond to cues.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor
1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading
1. Ask the students to discuss what each did to

help others talk. Choose all students in each group to demonstrate 2-3 answers.

2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Teacher Evaluation

1. Two lessons were combined in some classes because the students appeared to grasp the task. Task was extended to sums of 10 in other classes.
2. Two groups were malfunctional because the strongest student in each decided that he did not wish to participate. Claimed it was "too easy".
3. In another class, the same group as before could not agree on who was to go first, and again lost their bonus point. One of the students is disliked by all. It was suggested to him privately that he could earn points for his entire group every time he volunteered to let someone else go instead. This was an opportunity for him to gain favor with his peers. While he ostensibly agreed, he wanted to know what he would get.
4. Students in two groups in one class spontaneously grasped the objective of the next lesson and stated it to the entire class.

Lesson Four

Lesson Objective: Internalize sums to 5, 1 + N.

Set the Lesson. Teacher explains, states, or demonstrates:

1. Task. Use 1 more than and commutative law (eg. 4 + 1 = 5, 1 + 4 = 5). Show with counters. Oral drill. Role play the procedure as follows:
   - Step 1: Driller reads number fact sentence from card with answer, repeats leaving out answer. Drillees repeat whole sentence with answer.
   - Step 2: Driller repeats process but leaves out one input number. drillees respond with complete sentence fact.
   - Step 3: process repeated with other addendum.
   - Step 4: Driller takes next number fact set and repeats steps 1-3. Continue until all 5 sets are presented.
   - Step 5: Driller shuffles cards and presents again.
2. Positive interdependence. Each group has one set of materials, and all must master the facts. Each student must be able to respond to the cards.
3. Role interdependence. One student is the 'driller' and the other two are the 'drillees'. Alternate roles.
4. Individual accountability. One member randomly picked to demonstrate skill.
5. Criteria for success. Students must quickly respond to cues.
6. Expected behaviors. Move into groups without noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose all students in each group to demonstrate 2-3 answers.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.

3. Ask if anyone used a special (systematic) way to add.

Teacher Evaluation

1. Drill procedure was used by most groups so that it involved only two students at a time. The third student in some groups engaged in disruptive behavior.
2. In one group the slowest student was ostracized by the other two and then blamed for the group's failure to meet the criterion. A suggestion that the group attempt to involve the slow student in the task was met by complaints from the other two students and from the classroom teacher. Alternate procedures were demonstrated.
3. Group assignments were changed, because it was determined that two students in one group were "best friends" who elicit and reinforce each other's misbehavior.

Lesson Five

Lesson Objective: Internalize sums to 5, 2 + N.

Set the Lesson. Teacher explains, states, or demonstrates:

1. Task. Use 2 more than and commutative law (eg. 4 + 2 =6, 1 + 4 = 6). Show with counters. Oral drill. Role play the procedure as follows:
   Step 1: Driller reads number fact sentence from card with answer, repeats leaving out answer. Drillees repeat whole sentence with answer.
   Step 2: Driller repeats process but leaves out one input number. drillees respond with complete sentence fact.
   Step 3: process repeated with other addendum.
   Step 4: Driller takes next number fact set and repeats steps 1-3. Continue until all 5 sets are presented.
   Step 5: Driller shuffles cards and presents again.
2. Positive interdependence. Each group has one set of materials, and all must master the facts. Each student must be able to respond to the cards.
3. Role interdependence. One student is the 'driller' and the other two are the 'drillees'. Alternate roles.
4. Reward interdependence. A daily chart was posted and points awarded only to groups.
5. Individual accountability. One member randomly picked to demonstrate skill.
6. Criterion for success. Students must quickly respond to cues.
7. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose all students in each group to demonstrate 2-3 answers.
2. Record if criterion was met. Tally on a scratch

sheet and announce the results.

3. Ask if anyone used a special (systematic) way to add.

Teacher Evaluation

1. All teachers participating in the project had taken responsibility for instruction by this time.
2. Lesson 5 was expanded into a series of cooperative lessons by the classroom teachers. This objective was integrated into 2 of those lessons.
3. The two friends whose group assignments were changed objected strenuously to working in different groups. One student responded by directing and criticizing the others in his group.Noncollaborative behaviors not targeted were ignored. The student's objections were largely overcome by pointing out ways in which his new group can meet his instructional needs. The other student initiated and engaged in noncollaborative behaviors that, according to him, were to prevent the new group from earning any reward. A procedure was developed that would allow the others in his group to earn points toward a group reward by ignoring his disruptive behavior and continuing to cooperate. The procedure will be held in reserve in case its needed.

Lesson Six

Lesson Objective: Fill in missing elements in addition number sentences

Materials for each group.

1. 10 colored counters. (plastic bears, cubes, etc.)
2. ditto paper and one pencil

Set the Lesson. Teacher explains, states, or demonstrates:

1. Task. Fill in missing input/output in horizontal and vertical number sentences, using sums through 5. Demonstrate each with the counters.
2. Positive interdependence. Each group has one set of materials, and must produce one result. Each student must be able to explain what was done.
3. Role interdependence. One student is recorder, one is counter manipulator, and one counter checker. Can alternate roles.
4. Individual accountability. One member randomly picked to demonstrate group's product.
5. Criteria for success. Number symbols must accurately represent objects.
6. Expected behaviors. Move into groups without undue noise. Speak in soft voices. Stay in groups. Use materials appropriately.

Monitor

1. Monitor by silently observing activity. Assist only when needed. Prefer always to turn problem back to group.
2. Praise appropriate social skills. Intervene to teach needed skills.

Processing and Grading

1. Ask the students to discuss what each did to help others talk. Choose the weak students in each group to explain papers and demonstrate 2-3 answers with counters.
2. Record if criterion was met. Tally on a scratch sheet and announce the results.
3. Ask if anyone used a special (systematic) way to add.

Teacher Evaluation

1. Task was changed so that counters were used only as needed.

APPENDIX F

SOCIAL SKILLS LESSON PLAN

Social Skills Lesson Plan

Proposed Skills

1. Listen to each member explain
2. Deciding on turns
3. Stay on task
4. Take roles within group
5. Decide on seating within group

Reinforcing skills

1. Use names when talking to one another
2. Stay with group
3. Use quiet voices

STEP 1: Communicating the need for social skills

1. Verbal explanation stating that everyone is capable of mastering the skill.
2. Poster listing the skill
3. Chart with squares for daily group bonus points, and number required for specified reward.

STEP 2: Defining the skill

1. Specific phrases to listen for:
    - a) Can you tell us, or explain?
    - b) How do you know that's right?
    - c) Show me how to do this.
    - d) You do it now.
2. Specific behaviors to look for:
    - a) One person talking
    - b) Others looking at the person talking
    - c) Different individuals talking- not one person all the time
3. Explanation and modeling by:
    - a) Role play using teacher and child
    - b) Use T-chart on board. (What we see, what we hear)

STEP 3: Ensure that students practice the skill

1. Announce that teacher will observe
2. Practice first with nonacademic tasks

STEP 4: Ensure that students receive feedback and process use of skill

1. Outside observer structured observation of each student within a ten minute time span, marking each use of target skill.
2. Outside observer weekly anecdotal record of students' interaction.
3. When social skills are not being used properly:

    - a) Call attention to the fact and question the group as to a better plan.
    - b) Take individual student aside and develop plan for positive functioning
4. When social skills are used:
    - a) Note it on observation sheet and call attention to it during processing
    - b) Interrupt and compliment the group
    - c) Call attention to it during whole-class processing
5. Group processing will give examples of specific uses of the skill.

STEP 5: Opportunities to practice social skill

1. All sessions in the academic unit (average 3 times a week) will reward and stress the social skill.
2. Ask each group how well each member is using the skill
3. Periodically give any group who exercises perfect use of the one targeted skill extra bonus points.

Social Skills Translation Sheet

Targeted social skill Listen to each member explain

How the skill will be introduced so that each student sees a need to develop it

1. Verbal explanation stating that everyone is capable of mastering the skill.
2. Poster listing the skill
3. Chart with squares for daily group bonus points, and number required for specified reward.

Defining the skill

1. Specific phrases to listen for:
    - a) Can you tell us, or explain?
    - b) How do you know that's right?
    - c) Show me how to do this.
    - d) You do it now.
2. Specific behaviors to look for:
    - a) One person talking
    - b) Others looking at the person talking
    - c) Different individuals talking- not one person all the time
3. Explanation and modeling by:
    - a) Role play using teacher and child
    - b) Use T-chart on board. (What we see, what we hear)

Ensure that students practice the skill by

1. Announce that teacher will observe
2. Practice first with nonacademic tasks
3. Positive feedback from peers when targeted students help peers obtain rewards through inter- and intragroup cooperation.

The skill will be processed through

1. Outside observer structured observation of each student within a ten minute time span, marking each use of target skill.
2. Outside observer weekly anecdotal record of students' interaction.
3. When social skills are not being used properly:
    - a) Call attention to the fact and question the group as to a better way.
    - b) Take individual student aside and develop plan for positive functioning
4. When social skills are used:
    - a) Note it on observation sheet and call attention to it during processing

   - b) Interrupt and compliment the group
   - c) Call attention to it during whole-class processing

5. Group processing will give examples of specific uses of the skill.

Opportunities to practice social skill

1. All sessions in the academic unit (average 3 times a week) will reward and stress the social skill.
2. Ask each group how well each member is using the skill
3. Periodically give any group who exercises perfect use of the one targeted skill extra bonus points.

When the skill is mastered

Students will listen to each other and no one student will assume dictatorial control